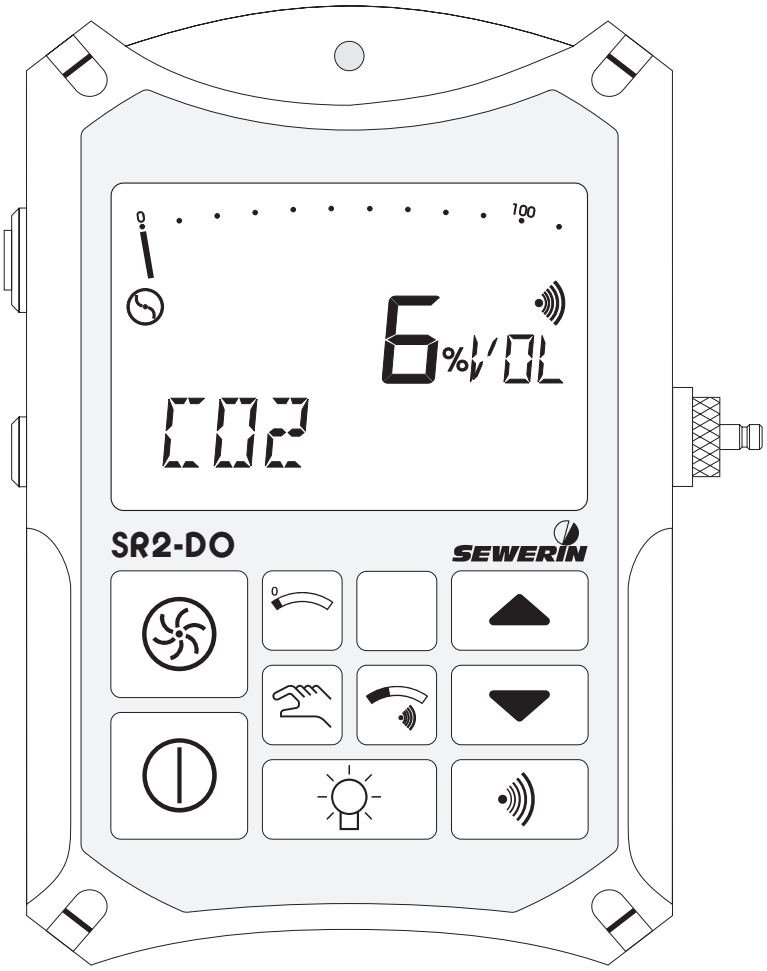
Operating instructions

SR2 - DO



SEWERIN

GB

103952

Measurable success by Sewerin equipment

You settled on a precision instrument.
A good choice!

Our equipment stands out for guaranteed safety, optimal output and efficiency.

They correspond with the national and international guide-lines.

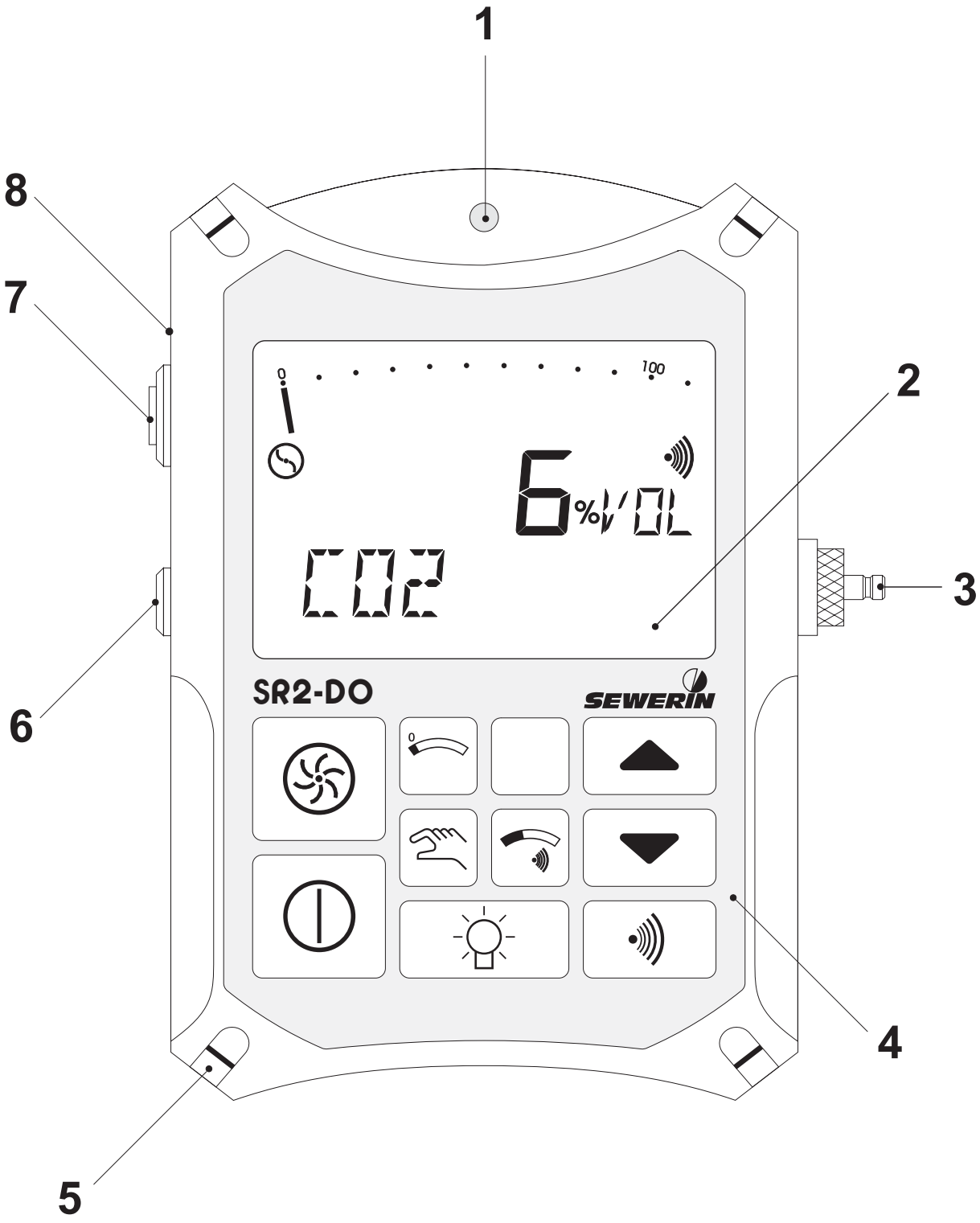
These operating instructions will help you to handle the instrument quickly and competently.

Please pay close attention to our operating instructions before usage.

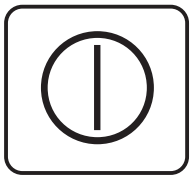
In case of further queries our staff is at your disposal at any time.

Yours

Hermann Sewerin GmbH
Robert-Bosch-Straße 3
D-33334 Gütersloh
☎ : +49 - (0) - 52 41/9 34-0
FAX : +49 - (0) - 52 41/9 34-4 44
www.sewerin.com
info@sewerin.com



Note:
Please see explanation of each position on page 19!



on/off switch

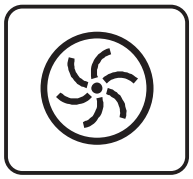
toggles between automatic and manual gas switching

switches gas displayed
(... in manual operation)

zero-point correction of gas displayed

acoustic alarm clearance
alarm switch-off (deactivation)

LCD illumination on / off
(... switches off automatically after about 4 minutes)



pump on / off

Operating instructions

SR2-DO

GB 103952 - 19.11.2004 / V2.1

This product may only be operated by appropriately-trained persons who are familiar with the relevant operating manual.

It may only be used for its designated purpose, i.e. for industrial and commercial use.

Repair work may only be carried out by specialists or by persons who have undergone appropriate training.

Any alterations or modifications to the product require the prior approval of Hermann Sewerin GmbH. In the event of unauthorised alterations to the product the manufacturer accepts no liability for damage.

Only Hermann Sewerin GmbH accessories may be used with the product.

Only spare parts approved by us may be used for repairs.

Hermann Sewerin GmbH accepts no liability for damage resulting from non-compliance with the foregoing. The guarantee and liability provisions in the Hermann Sewerin GmbH terms of sale and supply are not extended by the foregoing.

We reserve the right to make changes in the context of continued technical development.

In addition to these instructions, please comply with generally applicable safety and accident-prevention regulations.

Symbols used:

CAUTION!
This symbol warns of dangers that may threaten the safety of the user or maty damage or destroy the product.

Note:
This symbol flags information and hints extending beyond the actual operation of the product .

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1 SR2-DO system

1.1 Multiple gas detector

The **SR2-DO** is a combined measuring instrument for a number of different gases. It consists of:

- the basic instrument, incorporating a pump and a data memory for documentation purposes
- Slots to plug-in a max. of 4 sensors to monitor up to 5 different gases (in case of using the combination sensor for methane and carbon dioxide)

The following sensors are available:

- methane CH_4/carbon dioxide CO_2 (combination sensor)
- oxygen O_2
- hydrogen sulphide H_2S
- ammonia NH_3
- carbon monoxide CO

1.2 Fields of application

The **SR2-DO** is suitable for the following fields of application:

Atmospheric monitoring in shafts and chambers in these fields:

- drinking-water supply (metering and transfer shafts)
- district-heating systems
- telecommunications shafts
- effluent-treatment systems (sewage works, pump sumps, digestion-tank areas, rain-overflow basins)
- traffic areas
- accessible culverts
- biogas plants

- **Measuring explosive mixtures**
  - due to leaking gas pipes near the shaft
  - due to the proximity of oil, coal, natural-gas or LPG storage facilities
  - due to the proximity of landfill sites, marshland, chemical works, filling stations or refineries
  - due to cleaning or coating work with substances containing solvents
  - due to the prohibited introduction of combustible substances into the canal network (e.g. petrol leaks)
  - due to the formation of methane in biogas plants

- **Measuring a shortage of oxygen/excess of nitrogen**
  - due to an increase in other gas components
  - due to the decomposition of organic waste in shafts (e.g. wet leaves)
  - due to welding and heating processes with naked flames
  - due to air depletion

- **Measuring toxic gases**
  - due to the formation of carbon dioxide by bacterial conversion processes
  - due to the formation of carbon dioxide in areas where there is mineral water
  - due to the formation of carbon dioxide in exhaled air
  - due to the formation of hydrogen sulphide in effluent
  - due to the formation of CO_2 and H_2S in biogas plants

1.3 Test certificates

Passive explosion protection

The **SR2-DO** has been tested for explosion protection in accordance with the European norm (CENELEC):

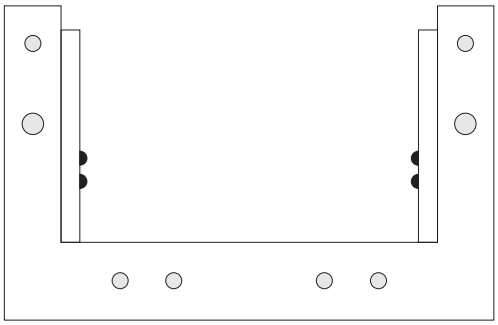
EC prototype test certificate:	PTB 96 ATEX 2166, plus supplements 1 and 3
Identification:	Ⓔx II 2 G EEx ib d IIB T3
Testing institution:	Physikalisch-Technische Bundesanstalt, Braunschweig

The test certificates can be found in the appendix.

> ☞ **Note:**
> Explosion protection is valid only for detectors with serial nos. beginning with 046 03 XXXX.
> Detectors with serial nos. beginning with 046 01 XXXX have no explosion protection.

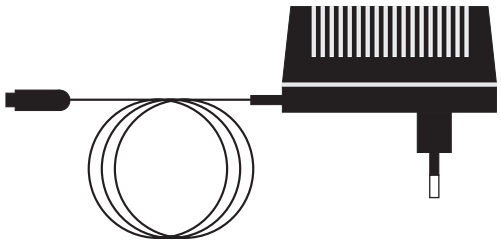
1.4 Charging equipment

The **SR2-DO** can be recharged in the workshop or the emergency vehicle:



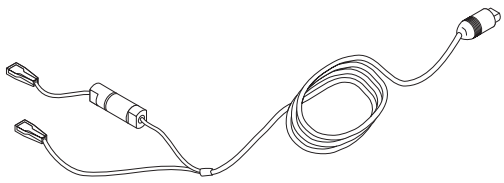
HS charging adapter

to hold the instrument, with a connection socket for the plug-in power pack or a vehicle adapter



230 V plug-in power pack

to connect the HS charging adapter to a 230-volt mains supply



12 V vehicle adapter

to connect the HS charging adapter to a 12-volt vehicle battery

(not shown)

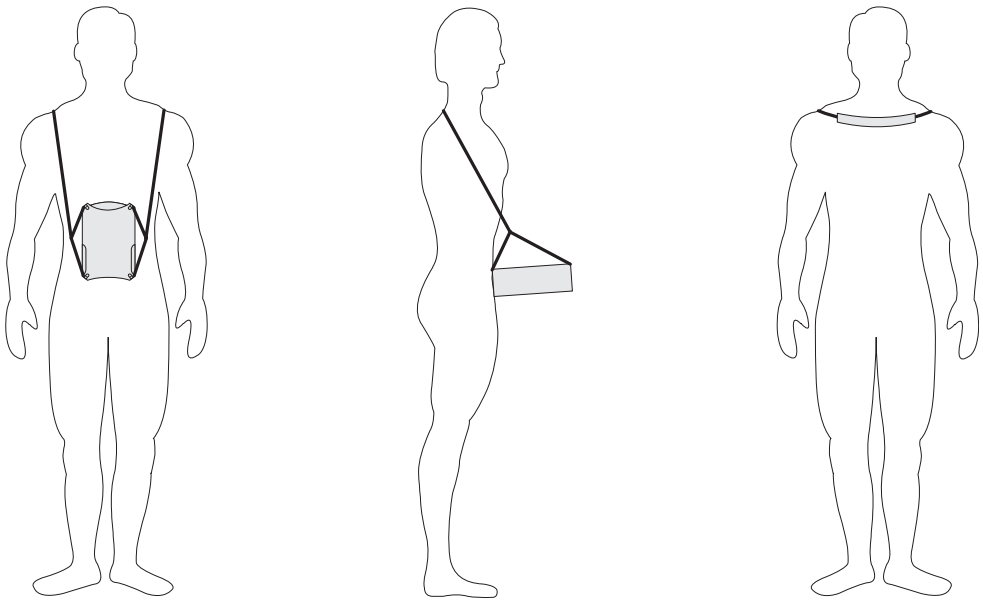
24 V vehicle adapter

to connect the HS charging adapter to a 24-volt vehicle battery

1.5 Carrying equipment

TRIANGEL carrying system

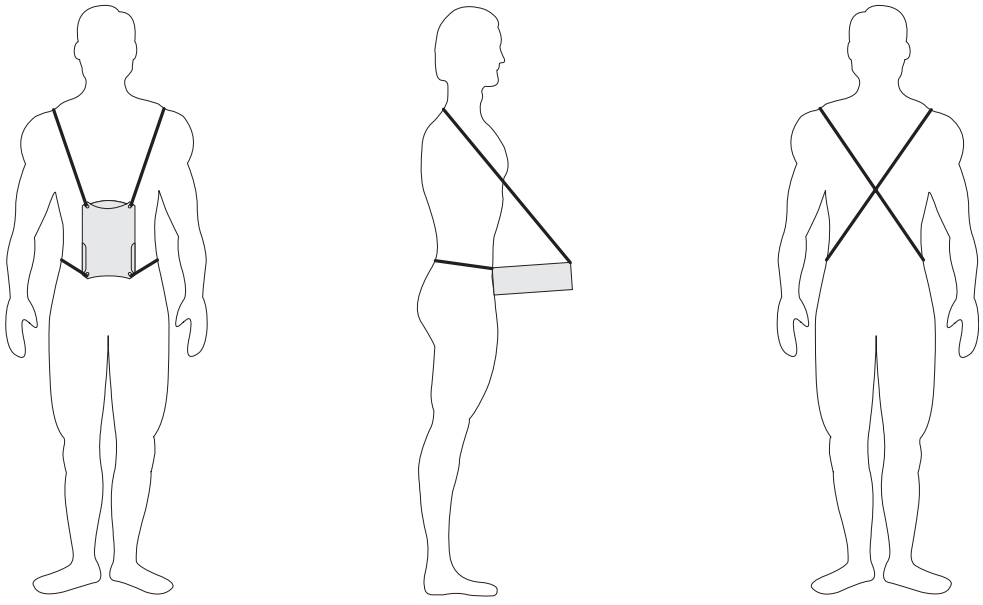
a quick and easy way of carrying the instrument, consisting of a carrying strap and neck-pad



front view **side view** **back view**

CROSS-STRAP carrying system

a comfortable way to carry the instrument for longer periods, consisting of 2 carrying straps crossed at the back



front view **side view** **back view**

VT/SR case

- lockable system case with aluminium frame
- foam lining with compartments
- the instrument can be charged in the case
- operating-manual compartment
- dimensions excluding handle: 710 x 180 x 420 mm (W x H x D)

VT/SR universal case (not shown)

- semi-rigid system case
- foam lining with compartments
- compartment for operating manual
- dimensions excluding handle: 540 x 130 x 400 mm (W x H x D)

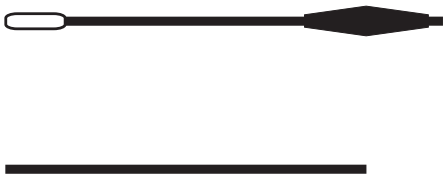
VT/SR case (not shown)

- leather case with viewing window and openings for instrument connections
- 4 lugs to attach the TRIANGEL or CROSS-STRAP carrying systems
- Velcro-fastening strap for attachment to the belt
- can be used where there is a danger of explosion

1.6 Probes

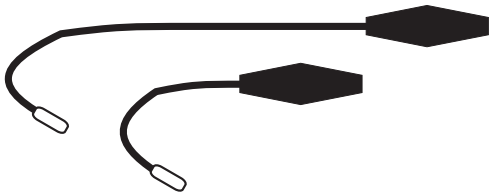
Floater probe

for measuring concentrations in shafts, floater with intake orifice and hose connection



Divisible manual probe

for measuring concentrations in containers or at inaccessible locations, grip with extension and hose connector, overall length 900 mm

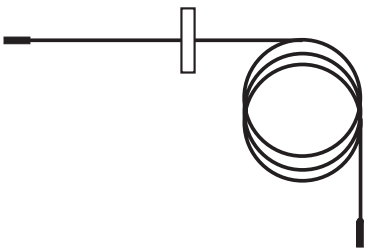


Flexible manual probes

for measuring concentrations in containers or at inaccessible locations, grip with flexible probe tip and hose
(overall lengths 360 mm or 660 mm)

Gas-detection probe

for measuring concentrations in probe holes, with a rigid rubber cone to seal off the probe hole and 2 different probe tips (length 245 mm or 345 mm)



Probe hose

to connect the warning device and the probe, with hydrophobic filter for moisture protection (in lengths 1 m, 2 m, 6 m)

1.7 Test equipment

The following accessories are available for monitoring and testing the pump performance and sensitivity of the **SR2-DO**:

Test set SPE VOL

for mobile and in-vehicle use, with connection for SEWERIN test gas bottles, flow meter, manometer, release key and connection hose

Test gas bottles

for testing and adjusting display sensitivity, various test gas concentrations in 1-litre bottles at pressures of about 12 bar

Test set SPE2

for non-mobile use in the workshop, with connections for several SEWERIN pressure cylinders, pressure and flow meter, release key and connection hoses

(not shown)

Pressure cylinders

for testing and adjusting display sensitivity, various test gas concentrations in 0.4 / 2.0 / 10.0 litre steel cylinders at pressures of 100 - 150 bar

2 Safety

2.1 Safety notes

CAUTION!
Please note that when the **SR2-DO** is in measuring operation the gas sample is released into the ambient air through its outlet.

Special care must be taken to ensure that this does not produce an explosive or toxic gas mixture, especially during use in confined spaces.

It may therefore be necessary to use a gas-warning device to monitor the air. We recommend the Ex-Tec Combi.

CAUTION!
Always use original SEWERIN accessories with the **SR2-DO**.

CAUTION!
Always use a probe hose with a hydrophobic filter.

CAUTION!
Do not operate outside the permissible temperature range of -10 °C to +40 °C.

CAUTION!
The **SR2-DO** may not be recharged in an area that is exposed to the danger of explosion.

CAUTION!
Use the test gases only in well-ventilated areas, as some concentrations exceed the pertinent MAK values.

CAUTION!
The **SR2-DO** satisfies the limits of the EMV regulation. When using it near (mobile) radio equipment please also observe the instructions in their manuals.

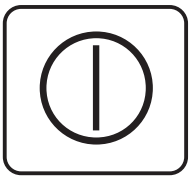
3 Measuring operation

3.1 Instrument description

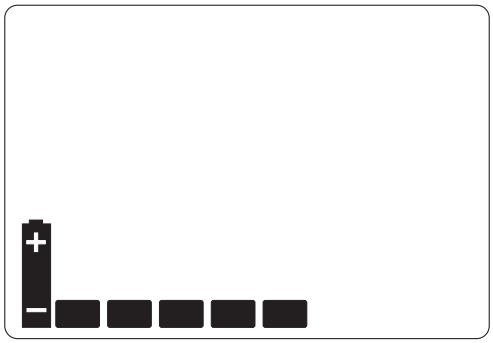
> **Note:**
> Fold out the illustration inside the front cover

Item	description	function
1	alarm lamp	optical warning on: ● breaching alarm thresholds ● display of error messages
2	LC display	display of: ● gas concentrations ● menu items ● operating conditions ● error messages
3	probe connection	connection for: ● probe hose ● test set
4	keypad	instrument operation
5	attachment	for carrying systems: ● Triangel ● cross-strap
6	outlet	for the gas sample
7	buzzer	acoustic warning on: ● breaching alarm thresholds ● display of error messages
8	interface	serial RS232 interface for connection to a PC

3.2 Switching on



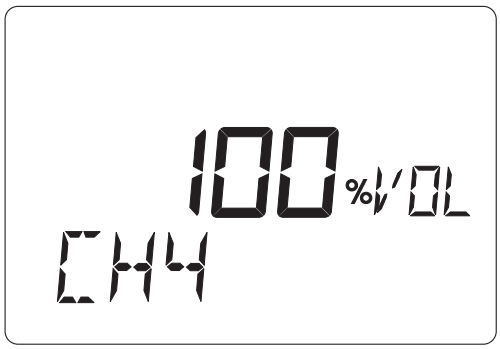
- always switch the instrument on in **"fresh-air"**
- press the **on/off key** for about 3 seconds
- the optical and acoustic control signals (items 1 and 7) operate for about 3 seconds
- the LC display illumination automatically switches on for about 4 minutes



- available operating hours are displayed in the form of the battery symbol and bars (e.g.: 5 hours = 5 bars)
- the built-in pump runs at constant power

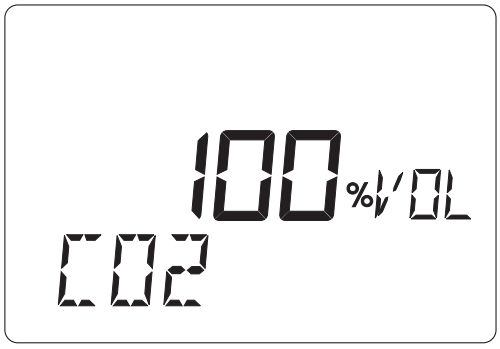
- the software version number (e.g. **2.1**) and instrument type **(SR2-DO)** are displayed

> **Note:**
> All following instrument displays show a **SR2-DO** to measure 5 gases (CH_4 – CO_2 – O_2 – H_2S – NH_3)!



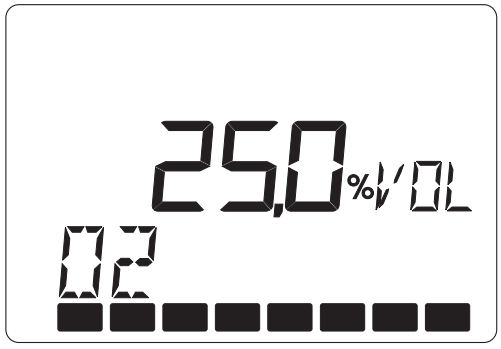
CH4 - methane

- the measurement range for methane is displayed:
  0.0 ... 100 vol.%
- depending on your last setting a display in the **vol.%, %GAZ** quantities may also be possible (cf. section 7.4: Adjusting the CH_4 sensor)



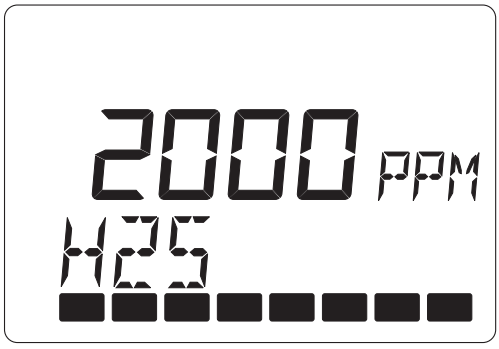
CO2 - carbon dioxide

- the measurement range for carbon dioxide is displayed:
  0 ... 100 vol.%
- depending on your last setting a display in the **vol.%, %GAZ** quantities may be possible (cf. section 7.5: Setting the measurement quantity)



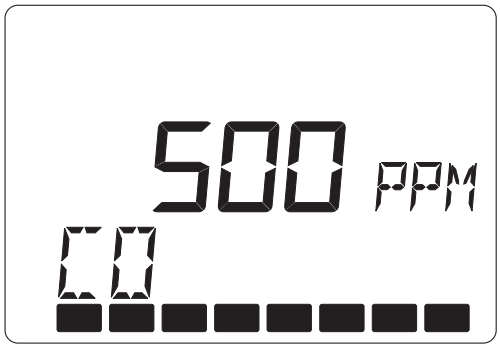
O2 - oxygen

- the measurement range for oxygen is displayed:
  0.0 ... 25.0 vol.%
- depending on your last setting a display in the **vol.%, %GAZ** quantities may be possible (cf. section 7.5: Setting the measurement quantity)
- display of the sensor lifetime in the form of bars (cf. section 10.2: Technical data):
  8 bars = 100%



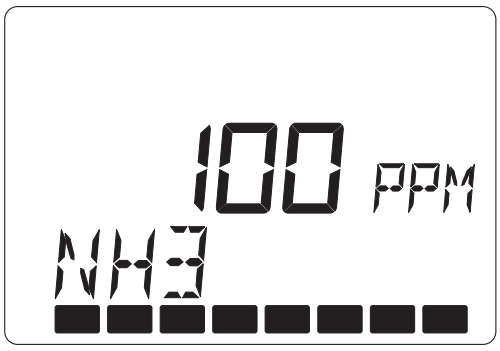
H2S - hydrogen sulphide

- the measurement range for hydrogen sulphide is displayed:
  0 ... 2000 PPM



CO - carbon monoxide

- the measurement range for carbon monoxide is displayed:
  0 ... 500 PPM

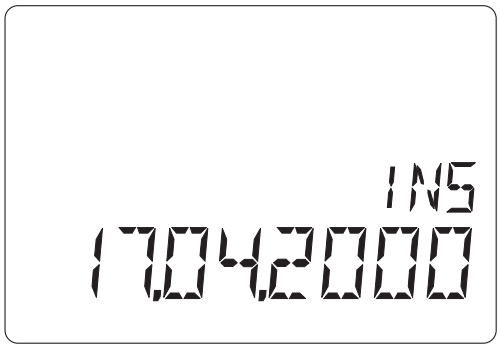


NH3 - ammonia

- the measurement range for ammonia is displayed**:**
  0 ... 100 PPM

Time / date

- the current time (e.g.**17:49**) and date (e.g. **24.02.2000**) are displayed
- properly-set values are important for the documentation of your readings
- you can correct any variances (cf. section 9.2: Setting the date/ time)



Next scheduled inspection
(display optional)

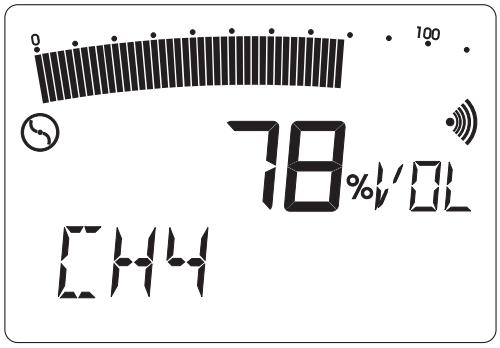
- if you have set an inspection interval, the next scheduled inspection date (e.g. **17.04.2000**) is displayed for about 3 seconds (cf. section 9.3: Setting the inspection interval)
- depending on the current and inspection dates, the intermittent or continuous alarm may also be triggered (items 1 and 7)

- clearing the alarm with the **buzzer key** or waiting for 15 seconds switches to measuring operation

Note:
If the **SR2-DO** now automatically switches off, the inspection date has passed with the inspection block switched on (cf. section 9.4: Setting the inspection block).

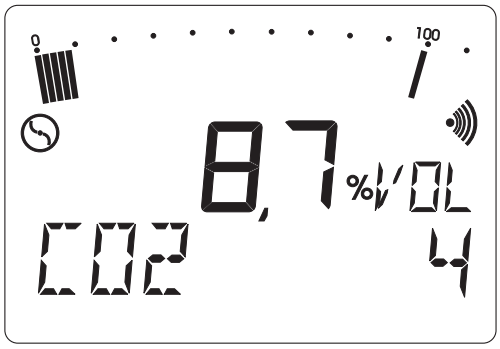
The instrument does not revert to measuring operation until an inspection has been carried out and confirmed.

3.3 Measuring operation



- each gas present is displayed for about 3 seconds; the display then switches to the next
- the pump runs at maximum power
- the alarm threshold is activated

Note:



- on instruments that are only fitted with the CH_4/CO_2 sensor, both readings are displayed simultaneously.

  In this example the readings are 8.7 vol.% CH4 and 4 vol.% CO2.

3.4 Switching gases

- pressing the **manual key** toggles between automatic and manual gas switching

Automatic switching

- each gas is displayed for about 3 seconds; then the display switches to the next

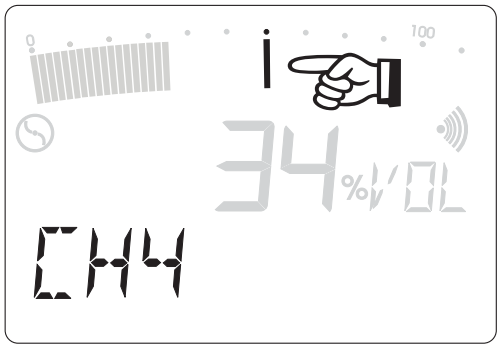
Manual switching

- each gas remains displayed until you press a **cursor key**
- pressing a **cursor key** switches to the next gas

3.5 Alarm

An alarm threshold can be set on the **SR2-DO**. The alarm is triggered if the concentration of CH_4, CO_2, or O_2 exceeds this threshold.
(Note: no alarm threshold is possible for the H_2S concentration.)

3.6 Displaying the alarm thresholds



- press and hold down the **threshold-value key**: the current alarm threshold is displayed by a flashing bar

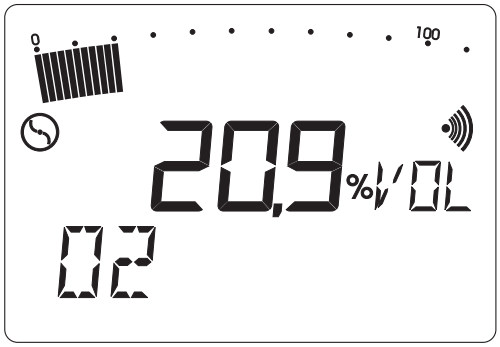
- the alarm can be cleared
- if the concentration falls below this alarm threshold, the optical and acoustic alarms (items 1 and 7) switch off

3.7 Zero-point correction

- after it is flushed with "fresh-air" the **SR2-DO** may deviate from its zero point (observe the tolerances); it can be manually corrected as follows:

- press the **zero-point key** to set the zero point of the gas displayed (up to 5 % from the end of the measuring range)
- if the zero point cannot be set, the sensor must be adjusted (cf. chapter 7: Adjustment menu)

O2 zero point

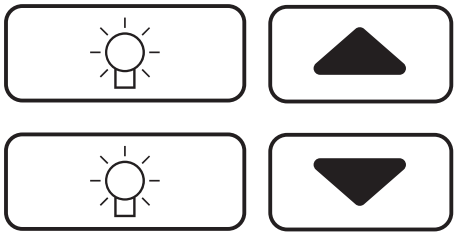


- the zero point for oxygen is **20.9** vol.%, since this is the concentration found in normal fresh-air

3.8 Illumination and contrast

Illumination

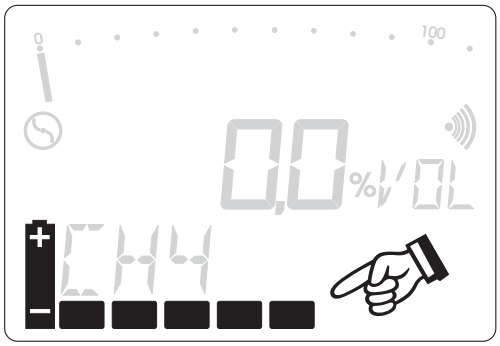
- pressing the **light key** switches the LC display illumination on and off
- the illumination automatically switches off again after about 4 minutes



Contrast

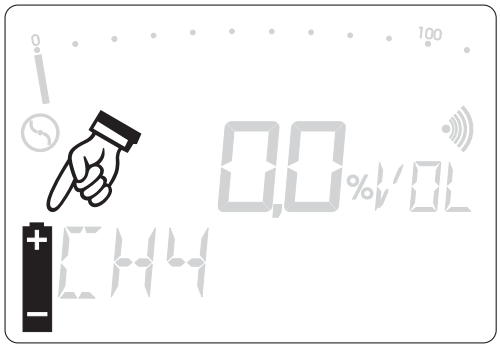
- simultaneously pressing the **Light key** and a **cursor key** increases or reduces the contrast of the LC display
- your last setting is preserved even when the instrument is switched off

3.9 Operating-hours display and battery alarm



Operating-hours display

- simultaneously pressing **both cursor keys** during measuring operation displays the number of operating hours remaining (e.g. 5 hours)
- this display (battery symbol and bars) disappears automatically after about 10 seconds

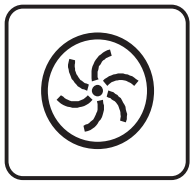


Battery alarm

- if the charge falls below a threshold value, the battery symbol appears, the alarm lamp flashes and an acoustic signal is triggered

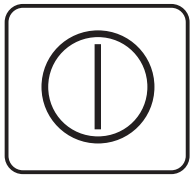
- the battery alarm can be cleared with the **buzzer key**

3.10 Pump function

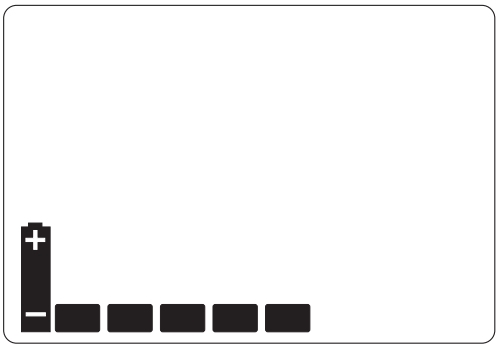


- the pump runs at constant power; it can be switched on and off with the pump key at any time
- on instruments with an H_2S sensor the pump cannot be switched off

3.11 Switching off



- press the **on/off key** for about 3 seconds
- the optical and acoustic control signals (items 1 and 7) operate for about 3 seconds



- remaining operating hours are displayed in the form of the battery symbol and bars (e.g. 5 hours = 5 bars)

3.12 Interface

The instrument can be connected to a PC via the RS 232 serial interface. For details please consult the manual for the PC software required.

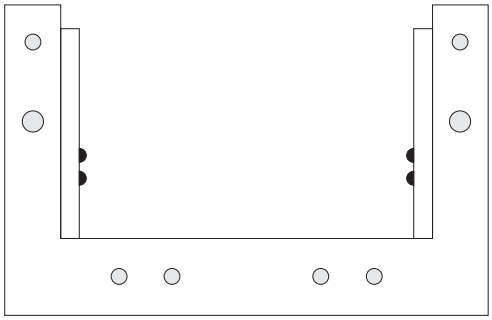
4 Charging

4.1 Charging and charge maintenance

Charging

When fully charged the instrument has a **minimum** of 10 hours' operating time with the pump running.

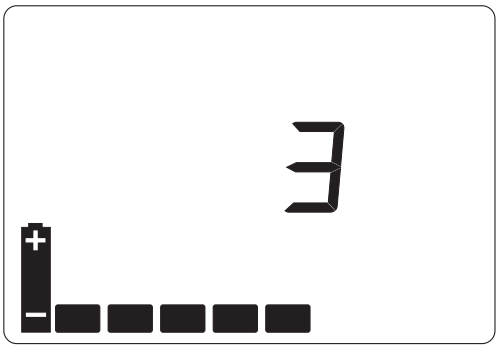
To charge the instrument you will need the **HS charging adapter** (see illustration), which can be used in the workshop or the emergency vehicle.



The following connection sockets can be found on the side of the charging adapter:

- 230-V plug-in power pack,
- 12-V vehicle adapter,
- 24-V vehicle adapter.

Switch the **SR2-DO** off and place it in the charger. A display on the following lines appears:



- the instrument still has 5 operating hours left (= 5 bars) and will take another 3 hours to be fully recharged
- if it is fully charged, all the bars appear and the numerical display disappears

Charge maintenance

As soon as the instrument is fully charged it automatically switches to charge maintenance. It can be left in the charging adapter until the next time it is needed.

4.2 Self discharge

If the instrument is not placed in the charging adapter when it is switched off, this will cause the nickel-cadmium battery to self-discharge, reducing the remaining operating time.

After a maximum of 30 days the instrument indicates no remaining operating hours and it must be recharged.

Note:
Brief periods of use and protracted disuse may in the long term lead to the so-called "memory effect", which means that the actual battery capacity available is less than what is shown in the display.

You can counteract this by fully discharging the **SR2-DO** regularly (e.g. once a month): leave it switched on until it switches itself off, then recharge it.

5 Testing the instrument

5.1 Tests / upkeep

The instrument tests prescribed by DVGW worksheet G 465-4 (Technical information, note) are divided into the following sections. Testing includes the requisite equipment.

What?	Who?	When?
function test	user	before use
display-accuracy test (adjustment)	expert or specialist firm	daily to half-yearly
maintenance, servicing	SEWERIN, expert, authorised specialist firm	annually

Function test

This is the simplest form of instrument test. Carried out by the **user** before use, it comprises the following points:

- external condition including probe systems
- function of the operating controls
- battery-charging check
- inspection of the pump and the intake channel
- pump function
- zero-point check

Checking display sensitivity (adjustment)

Testing frequency must be specified as a function of the sensors fitted and the use of the instrument. It can be anywhere between daily and half-yearly.

Testing must be carried out by an expert on the operator's own staff, by a specialist firm or by Sewerin itself.

The function test should be carried out at the same time.

Upkeep - maintenance and repair

The instrument must be maintained at least once a year by **SEWERIN Service**, a **specialist firm** authorised by SEWERIN or a SEWERIN-authorised **expert**.

Certificates must be issued accordingly.

The test disc on the instrument confirms when maintenance was last carried out and indicates the next scheduled date (e.g. 5/00 = May 2000).

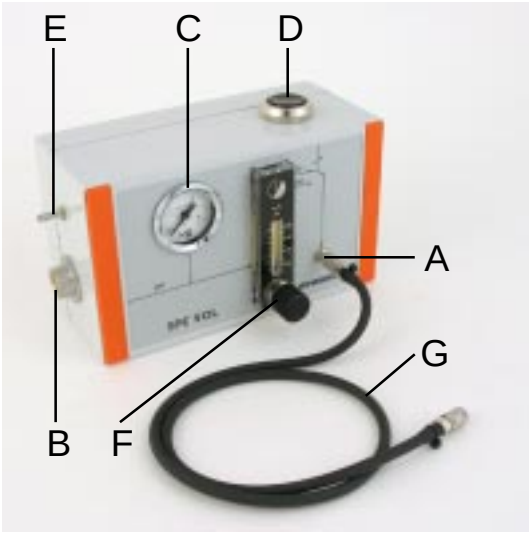
Annual maintenance and repair must cover at least the specialist care and adjustment of the instrument and the replacement of components with a limited useful life.

> ☞ **Note:**
> Where instruments have explosion protection the applicable regulations must be be observed.

> ☞ **Note:**
> Technicians responsible for upkeep must have been trained and instructed by Sewerin.

5.2 Test set

The **test set SPE VOL** is available to test the pump power, zero point and sensitivity:



(fig. 1)

Item	description	function
A	device connection	connection with: ● probe connection ● test heads
B	test gas connection	connection for: ● test gas bottles ● pressure hose adapter (in conjunction with pressure cylinder and pressure reducer)
C	manometer	Display of remaining pressure inside the test gas container
D	release button	release of test gas
E	fresh-air supply	opening for: ● aspirating fresh-air ● fresh-air hose
F	needle valve with flowmeter	setting the pump power reading the pump power in litres per hour (l/h)
G	connection hose	connected to: ● device

5.3 Test gases

The following test gases are used in conjunction with the test set SPE VOL to test the zero point and sensitivity:

Methane CH_4	
- zero point:	fresh-air
- sensitivity:	100 vol.% CH_4
Carbon dioxide CO_2	
- zero point:	fresh-air
- sensitivity:	100 vol.% CO_2
Oxygen O_2	**Caution! Zero point at 20,9 vol.%**
- zero point:	fresh-air
- sensitivity:	0 vol% O_2 with 100 vol.% CH_4
Hydrogen sulphide H_2S	
- zero point:	fresh-air
- sensitivity:	40 ppm H_2S in synthetic air
Carbon monoxide CO	
- zero point:	fresh-air
- sensitivity:	40 ppm
Ammonia NH_3	
- zero point:	fresh-air
- sensitivity:	50 ppm

These gases are supplied in 5 test gas bottles:

- 100 vol.% CH_4
- 100 vol.% CO_2
- 40 ppm H_2S in synthetic air
- 50 ppm NH_3 in nitrogen
- 40 ppm CO in synthetic air

5.4 Testing pump power, zero point and sensitivity

Proceed as follows:

- screw the selected test gas bottle onto the test set SPE VOL (fig. 1 - item B) as far as it will go
- connect the instrument's probe connection (item 3) with the hose of the test set SPE VOL (fig. 1, item A)
- switch the instrument on; the pump aspirates **fresh-air** through the test set SPE VOL (fig. 1, item E)
- enter your test results in the test report

Pump power

- use the needle valve (fig. 1, item F) to set the flow to maximum; it must be greater than 30 l/h

Zero point

- wait for the instrument to settle at a stable zero point; permissible tolerances with fresh-air are:

Gas	tolerance
Methane CH_4	-1.0 ... +1.0 vol.%
Carbon dioxide CO_2	-1...+1 vol.%
Oxygen O_2	20.4 ... 21.4 vol.%
Hydrogen sulphide H_2S	-10 ... 10 ppm
Carbon monoxide CO	-3 ... +3 ppm
Ammonia NH_3	-3 ... +3 ppm

If display values are outside these tolerances the pertinent sensor must be readjusted (cf. section 7: Adjustment menu).

Sensitivity

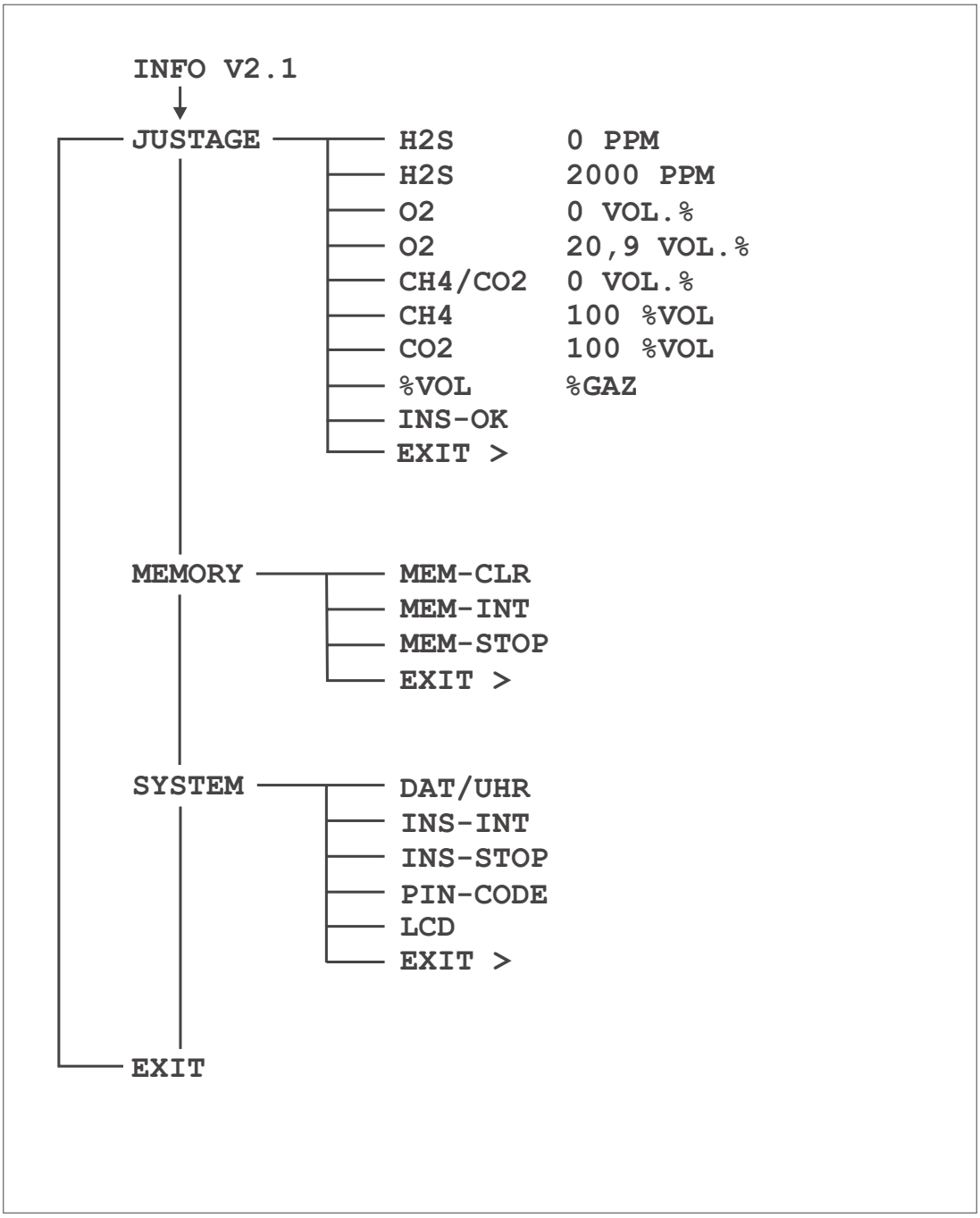
- press the release key (fig. 1, item D) on the test set SPE VOL and adjust the flow to the fresh-air value (fig. 1, item F)
- hold down the release key until the displayed concentration has settled at a stable value; permissible tolerances with test gases:

Gas	tolerance
Methane CH_4	97 ... 103 vol.%
Carbon dioxide CO_2	97 ... 103 vol.%
Oxygen O_2	-0.5 ... +0.5 vol.%
Hydrogen sulphide H_2S	36 ... 44 ppm
Carbon monoxide CO	37 ... 43 ppm
Ammonia NH_3	47 ... 53 ppm

If display values are outside these tolerances the pertinent sensor must be readjusted (cf. section 7: Adjustment menu).

6 Info menu

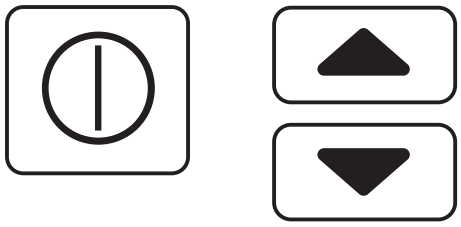
6.1 Menu structure



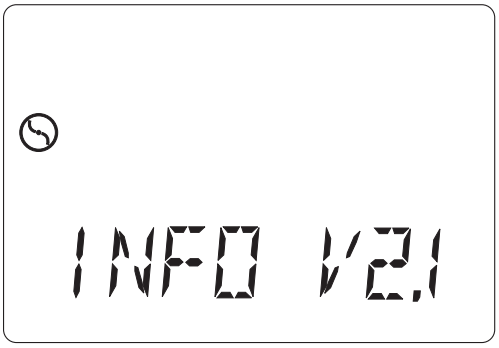
Note:
Volume and style of the menu items in the adjustment menu depend on number and type of sensors built-in to your instrument.

6.2 Overview

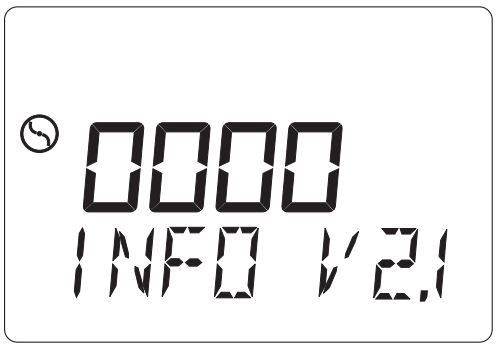
The information menu is accessible only when the **SR2-DO** is switched off.



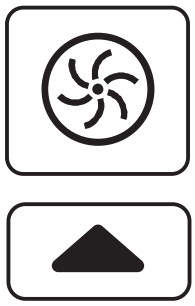
- now simultaneously press the following **3 keys**



- you are now in the **INFO** menu item (cf. menu structure)
- the software version number (e.g. **V2.1**) is displayed and the LC display illumination automatically switches on for about 4 minutes



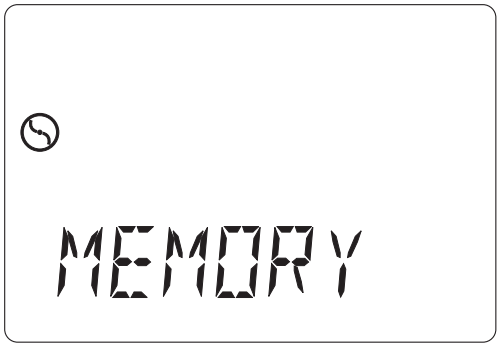
- you must now enter your **PIN code** (cf. section 9.5: Setting the PIN code)
- **0001** = factory settings
- only now do you have access to all menu items



- the pump runs at constant power; it can be switched on or off with the **pump key** at any time
- the **cursor-up key** returns you to the menu structure

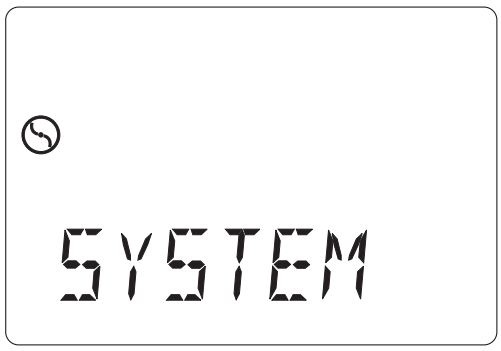
- you are now in the **adjustment** menu item (cf. section 7: Adjustment menu)

- the **cursor-up key** brings you to the next display



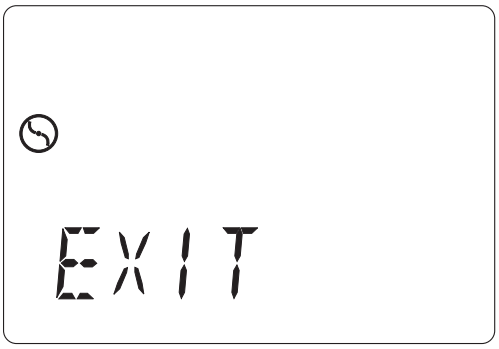
- you are now in the **MEMORY** menu item (cf. section 8: Memory menu)

- the **cursor-up key** brings you to the next display



- you are now in the **SYSTEM** menu item (cf. section 9: System menu)

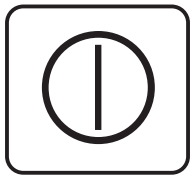
- the **cursor-up key** brings you to the next display



- you are now in the **EXIT** menu item
- there are now 2 ways of continuing to navigate through the menu structure

- pressing the **cursor-up key** returns you to the **adjustment** menu item (cf. menu structure)

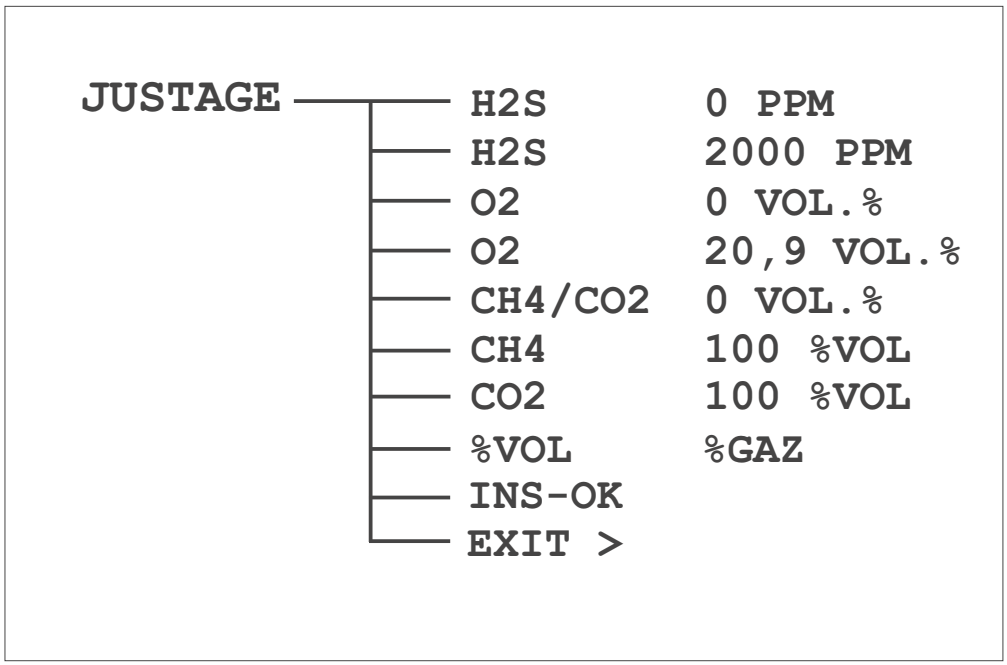
... or



- briefly pressing the **on/off key** leaves the menu structure and the instrument switches to measuring operation

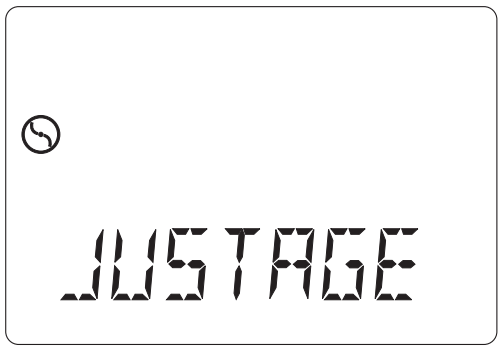
7 Adjustment menu

7.1 Menu structure

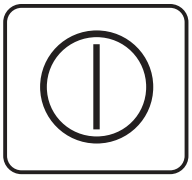


The illustration shows the adjustment menu of a H_2S-, O_2-, CH_4/ CO_2 sensor equipped instrument.

> **Note:**
> Volume and style of the menu items in the adjustment menu depend on number and type of sensors built-in to your instrument.



- you are in the **adjustment** menu item



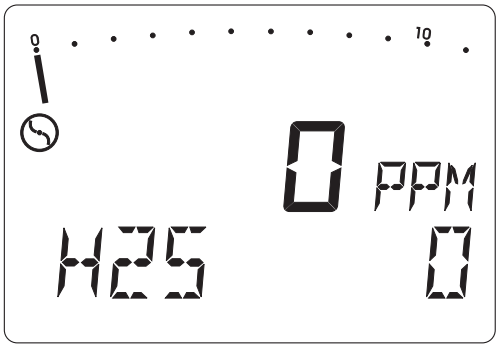
- briefly pressing the **on/off key** brings you to the adjustment menu

7.2 Setting the H_2S sensor

> **Note:**
> The pump always runs during adjustment of the H_2S sensor.

Preparation

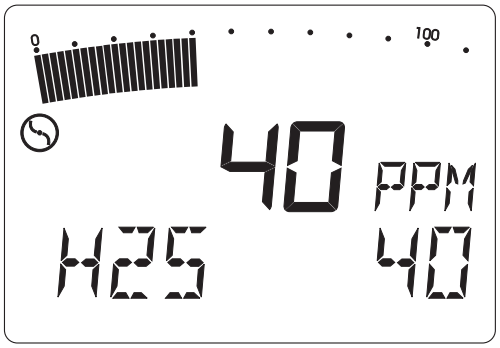
- the instrument hose connects the outlet of the test set to the instrument´s inlet
- switch-on device
- open needle valve fully



H2S - zero point 0 PPM

- environmental air is sampled
- wait for the display to settle at a stable value and confirm the adjustment with the on/off key (**OK** appears in the LC display)

- pressing the **cursor-up key** brings you to the next display



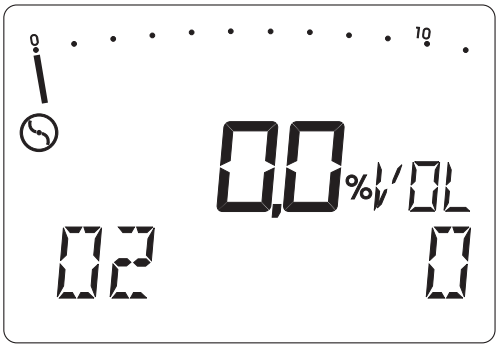
H2S - sensitivity 40 PPM

- now release **40 PPM H_2S test gas** from the test set SPE VOL
- wait for the display to settle at a stable value and confirm the adjustment with the on/off key (**OK** appears in the LC display)
- once this has happened, turn off the test gas feed

7.3 Setting the O_2 sensor

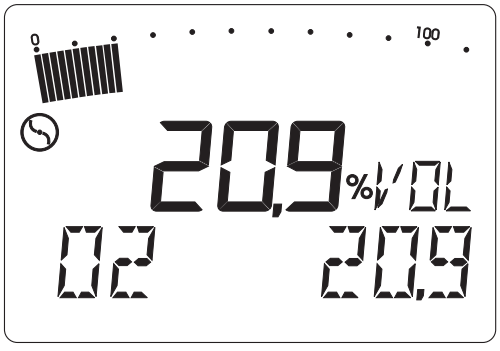
Preparation

- the instrument hose connects the outlet of the test set to the instrument´s inlet
- switch-on device
- open needle valve fully



O2 - sensitivity 0 vol.%

- now release **test gas 100 vol.% CH_4** from the test set SPE VOL
- wait for the display to settle at a stable value and confirm the adjustment with the on/off key (**OK** appears in the LC display)
- once this has happened, turn off the test gas feed
- pressing the **cursor-up key** brings you to the next display



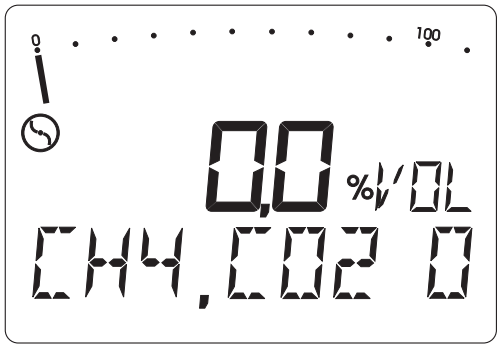
O2 - zero point 20.9 vol.%

- environmental air is sampled
- wait for the display to settle at a stable value and confirm the adjustment with the on/off key (**OK** appears in the LC display)

7.4 Setting the CH_4/CO_2 sensor

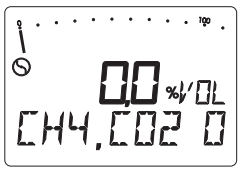
Preparation

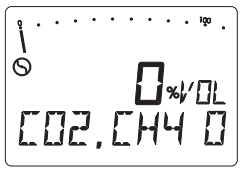
- the instrument hose connects the outlet of the test set to the instrument´s inlet
- switch-on device
- open needle valve fully



CH4/CO2 - zero point 0 vol.%

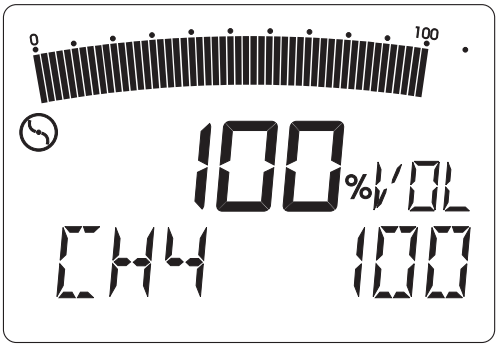
- environmental air is sampled
- wait for the display to settle at a stable value and confirm the adjustment with the on/off key (**OK** appears in the LC display)





- the display switches between **CH4 and CO2**

- pressing the **cursor-up key** brings you to the next display

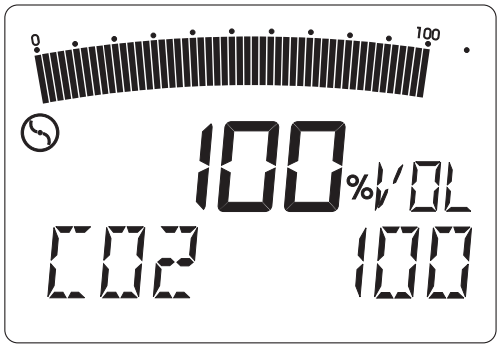


CH4 - sensitivity 100 vol.%

- now release **test gas 100 vol.% CH4** from the test set SPE VOL
- wait for the display to settle at a stable value and confirm the adjustment with the on/off key (**OK** appears in the LC display)
- once this has happened, turn off the test gas feed

> **Note:**
> Wait until the shown concentration reaches 0 vol. % before proceeding.

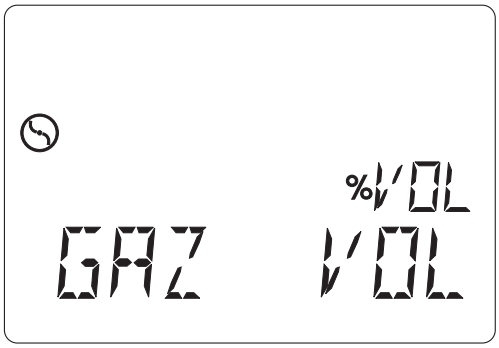
- pressing the **cursor-up key** brings you to the next display



CO2 - sensitivity 100 vol.%

- now release t**est gas 100 vol.% CO2** from the test set SPE VOL
- wait for the display to settle at a stable value and confirm the adjustment with the on/off key (**OK** appears in the LC display)
- once this has happened, turn off the test gas feed

7.5 Setting the measurement unit



CH4, CO2, O2 - vol.%-range language

- pressing the **on/off key** switches between the following displays in the vol.% range:
  vol.% - display in **vol.%** (D/GB)
  %GAZ - display in **%GAZ** (F)

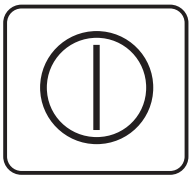
- confirm the display, e.g. **vol.%**, with the on/off key (**OK** appears in the LC display)
- this setting is preserved even when the instrument is switched off

- pressing the **cursor-up key** brings you to the inspection confirmation function

7.6 Inspection confirmation

INSPECTION OK

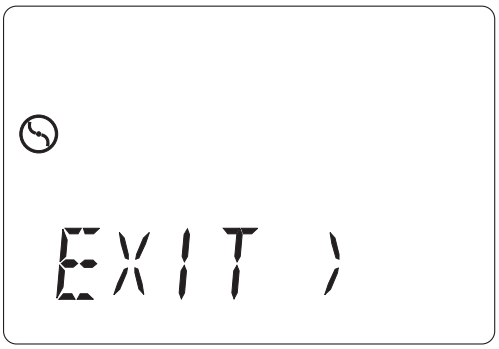
- the **SR2-DO** can remind you of scheduled inspection and adjustment dates
- this requires the **inspection interval** and the **inspection block** to be set in the system menu (cf. sections 9.3 and 9.4)



- confirm the inspection or adjustment you have carried out with the **on/off key** (**OK** appears in the LC display):
- this date is stored as a function of the set date (cf. section 9.2: Setting the date/time)
- the next inspection or adjustment date is calculated in accordance with the set inspection interval

- pressing the **cursor-up key** brings you to the exit from the adjustment menu

7.7 Leaving the adjustment menu

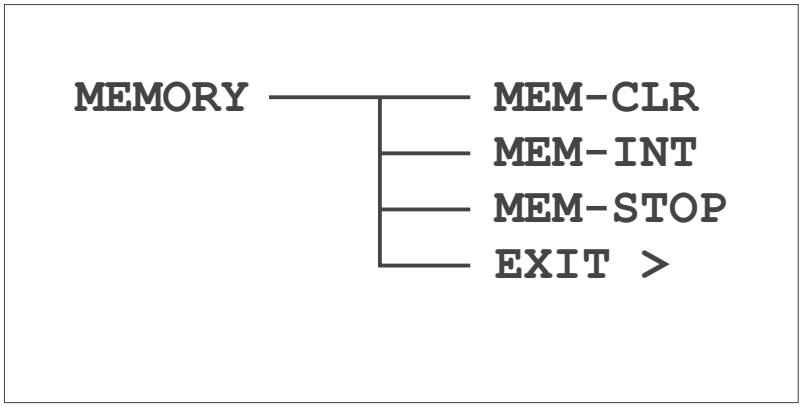


EXIT >

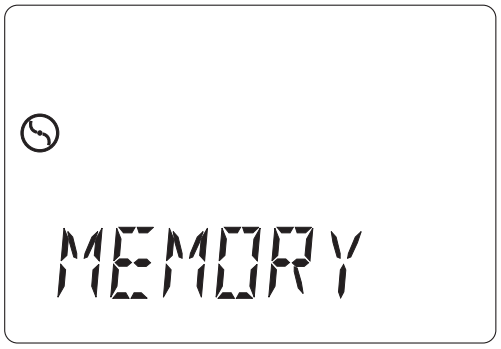
- signpost (>) to menu level 1
- pressing the **on/off key** leaves the adjustment menu
- you are now back at the top main-menu level and can switch between the following menu items:
  - **ADJUSTMENT**
  - **MEMORY**
  - **SYSTEM**
  - **EXIT**

8 Memory menu

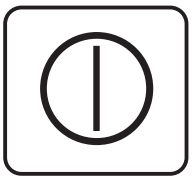
8.1 Menu structure



- the **SR2-DO** continuously stores readings from the sensors that are present
- these can later be read out with the appropriate evaluation software (separate user manual) via the RS232 interface (item 8)



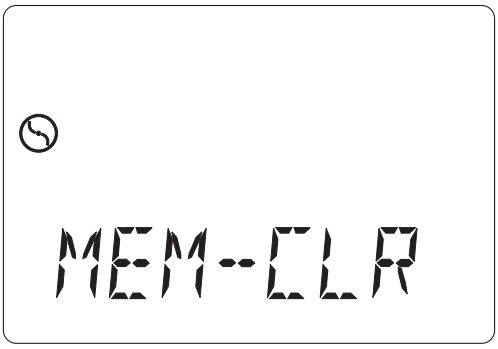
- you are in the **MEMORY** menu item



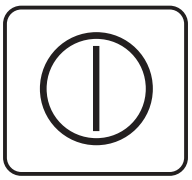
- briefly pressing the **on/off key** brings you to the memory menu

8.2 Clearing memory

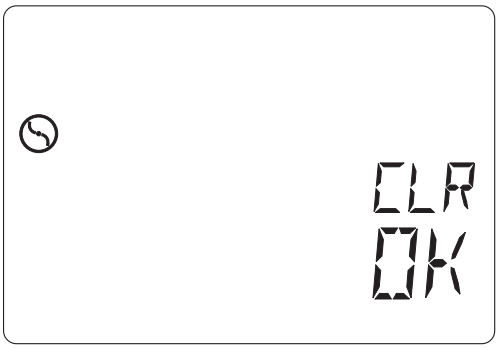
MEMORY CLEAR



- if you have set the **memory mode = stack memory** (cf. section 8.4: Setting memory mode), this function enables you to clear the memory of all readings

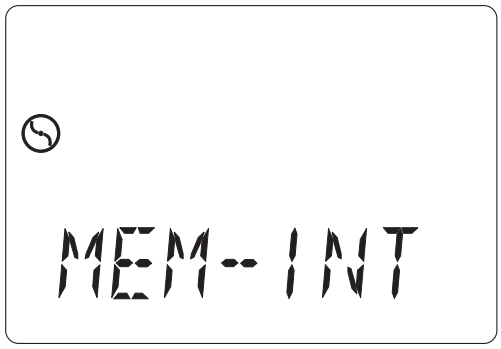


- confirm the clearance with the **on/off key** (**OK** appears in the LC display)



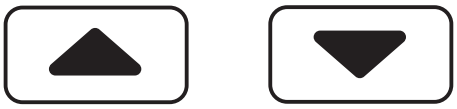
- pressing the **cursor-up key** brings you to the memory-interval setting facility

8.3 Setting the memory interval

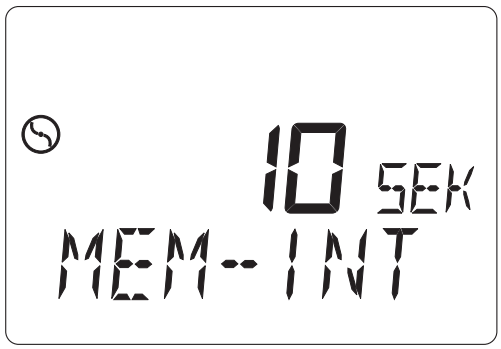


MEMORY INTERVAL

- briefly pressing the **on/off key** brings you to the memory-interval setting facility

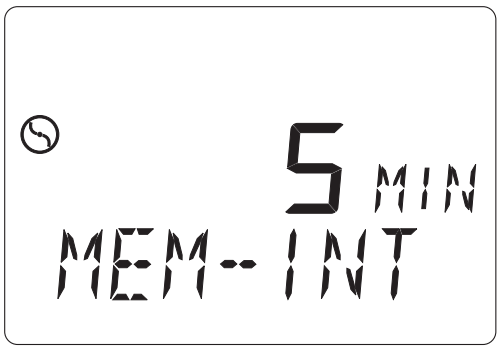


- by pressing or holding down a **cursor key** you can select the following memory intervals:



seconds range:

- 1 second
- 10 seconds
- 20 seconds
- 30 seconds



minutes range:

- 1 minute
- 2 minutes
- 3 minutes
- 5 minutes
- 10 minutes
- 20 minutes
- 30 minutes

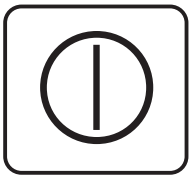
Data-memory capacity

- the **SR2-DO** stores the following values in its data memory:
  - readings for each gas (instantaneous values at the moment of scanning)
- depending on the set memory interval and the number of gases, data memory can continuously record for the following periods (times in hh:mm:ss):

Memory interval	2 gases	3 gases	4 gases
1 sec	1:44:53	1:02:50	0:41:48
10 sec	17:28:50	10:28:20	6:58:05
20 sec	34:57:40	20:56:40	13:56:10
30 sec	52:26:30	31:25:00	20:54:15
1 min	104:53:00	62:50:00	41:48:30
2 min	209:46:00	125:40:00	83:37:00
3 min	314:39:00	188:30:00	125:25:30
5 min	524:25:00	314:10:00	209:02:30
10 min	1048:50:00	628:20:00	418:05:00
20 min	2097:40:00	1256:40:00	836:10:00
30 min	3146:30:00	1885:00:00	1254:15:00

The above figures show the maximum possible recording duration. The recording duration can be reduced by the number of on/off cycles and the number of events occurring.

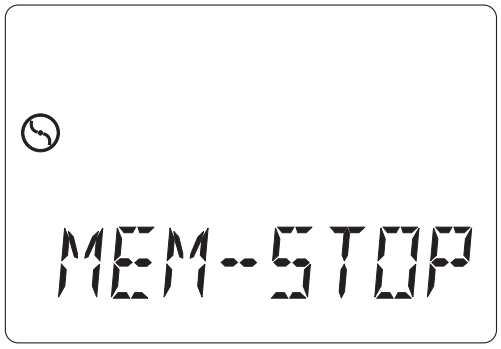
Example: when the instrument is set to warn for 4 gases and the memory interval is set to 1 minute, you can record readings over a period of 41 hours, 48 minutes and 30 seconds.



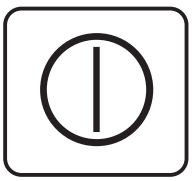
- confirm the interval with the **on/off key**
- this setting is preserved even when the instrument is switched off

- pressing the **cursor-up key** brings you to the memory-mode setting facility

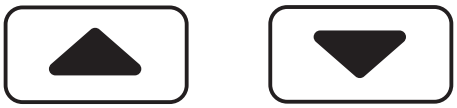
8.4 Setting the memory mode



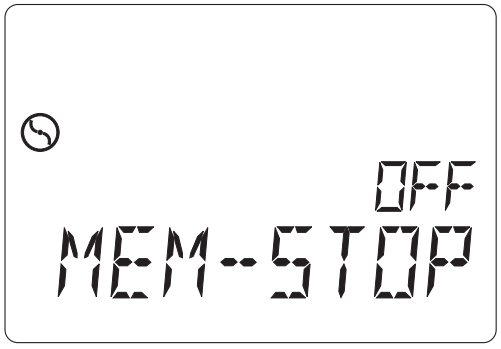
MEMORY STOP



- briefly pressing the **on/off key** brings you to the memory-mode setting facility

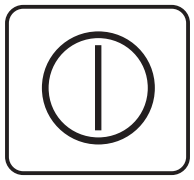


- by pressing a **cursor key** you can select the following memory modes:



OFF (ring memory)
readings are continuously written to memory; when memory is full the oldest values are overwritten

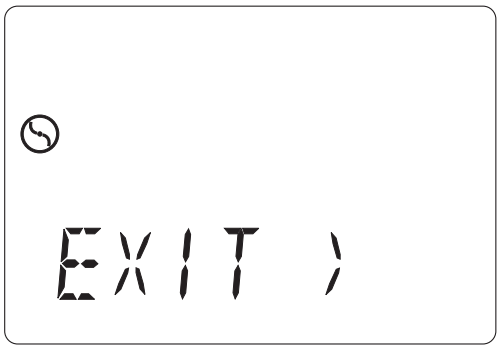
ON (stack memory)
readings are only written to memory until it is full, thus write-protecting the oldest values



- confirm the memory mode with the **on/off key**
- this setting is preserved even when the instrument is switched off

- pressing the **cursor-up key** brings you to the exit from the memory menu

8.5 Leaving the memory menu

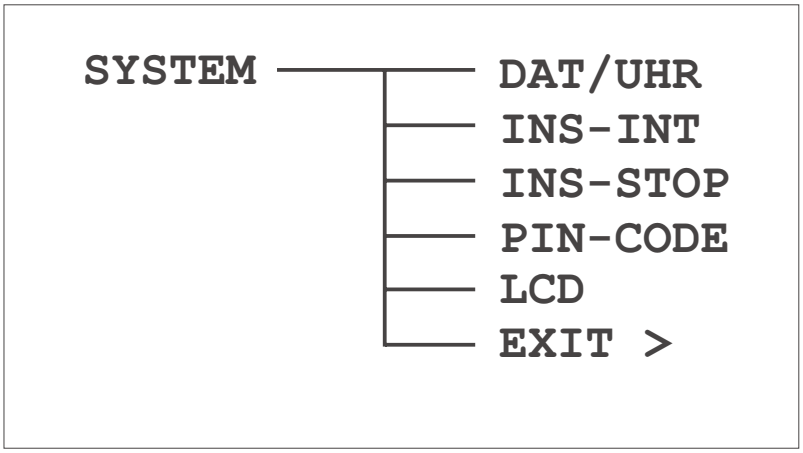


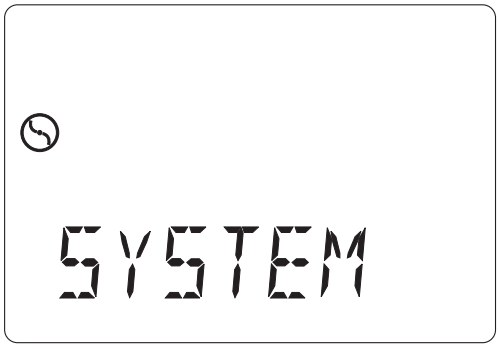
EXIT >

- signpost (>) to menu level 1
- pressing the **on/off key** leaves the memory menu
- you are now back at the top main-menu level and can switch between the following menu items:
  - **JUSTAGE**
  - **MEMORY**
  - **SYSTEM**
  - **EXIT**

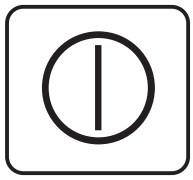
9 System menu

9.1 Menu structure



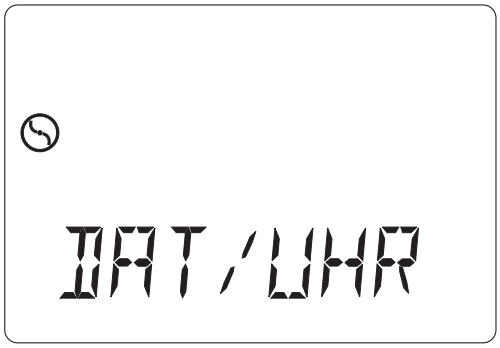


- you are in the **SYSTEM** menu item

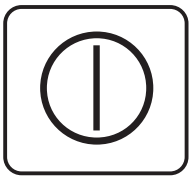


- briefly pressing the **on/off key** brings you to the system menu

9.2 Setting the date/time



DATE/TIME

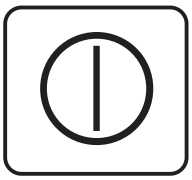


- briefly pressing the **on/off key** brings you to the date/time setting

Date

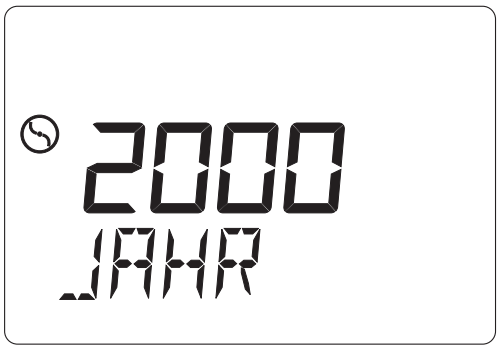
- the last **day** (24 - flashing) and **month** (02) to be set are displayed

- by pressing or holding down a **cursor key** ...



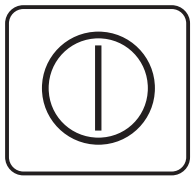
- ... and confirming with the **on/off key** you can set first the day and then the month to the current date

Year



- the **last year** (2000 - flashing) to be set is displayed

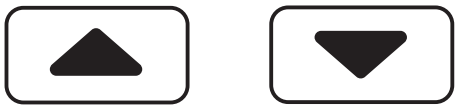
- by pressing or holding down a **cursor key** ...



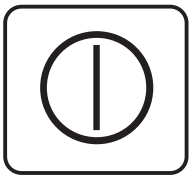
- ... and confirming with the **on/off key** you can set the current year

Time

- the last **hours** (17 - flashing) and **minutes** (49) to be set are displayed



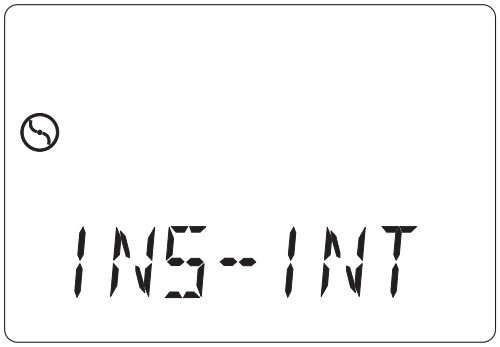
- by pressing or holding down a **cursor key** ...



- ... and confirming with the **on/off key** you can first set the hours and then the minutes to the current time
- these settings are preserved even when the instrument is switched off

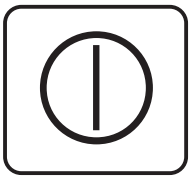
- pressing the **cursor-up key** brings you to the inspection-interval setting facility

9.3 Setting the inspection interval

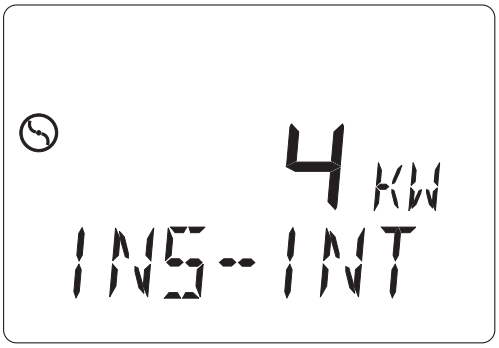


INSPECTION INTERVAL

- the **SR2-DO** can remind you of regular scheduled tests (e.g. inspections, adjustments)
- this reminder is based on the inspection interval

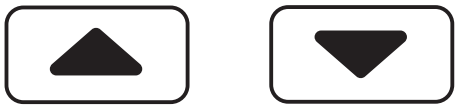


- briefly pressing the on/off key brings you to the inspection-interval setting facility

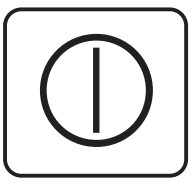


Inspection interval = 0 ... 52 CW

- the last interval to be set is displayed in **CW** (calendar weeks), e.g.:
  - **0 CW** = function inactive
  - **4 CW** = monthly
  - **52 CW** = annual



- by pressing or holding down a **cursor key** ...



- ... and confirming with the on/off key you can set the desired interval

- this setting is preserved even when the instrument is switched off
- pressing the **cursor-up key** brings you to the inspection-block setting facility

Example: inspection interval

February 2004						
Mo	Tu	We	Th	Fr	Sa	Su
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

March 2004						
Mo	Tu	We	Th	Fr	Sa	Su
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Selected inspection interval:
weeks 04

Inspection routine started
(i.e. inspection confirmed, cf. section 7.6):
10. 02. 2004

From these indications concludes:
the next inspection has to be effected between **09. - 15. 03. 2004**.

During the next 3 weeks the **SR2-DO** will display the following references to the inspection date:

24.02.2004 - 01.03.2004 (> 1 week before)

LC display:	the **coming** inspection date is displayed for about 3 seconds on switch-on
lamp / buzzer:	inactive
instrument:	the instrument then automatically switches to measuring operation

02.03.2004 - 08.03.2004 (1 week before)

LC display:	the **coming** inspection date is displayed for about 3 seconds on switch-on
lamp / buzzer:	flashing / intermittent
instrument:	the instrument then automatically switches to measuring operation

09.03.2004 - 15.03.2004 (the scheduled week)

LC display:	the **due** inspection date is displayed on switch-on
lamp / buzzer:	both operate continuously
instrument:	when the display is cleared with the buzzer key (item 4) or after waiting for about 15 seconds the instrument automatically switches to measuring operation

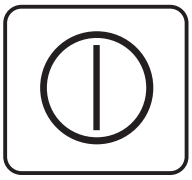
16.03.2004 - ... (from 1 week later)

LC display:	the **overdue** inspection date is displayed on switch-on
lamp / buzzer:	both operate continuously
instrument:	depending on the setting of the **INS-STOP** function (cf. section 9.4: Setting the inspection block) the following conditions are possible: **INS-STOP = OFF** when the display is cleared with the buzzer key (item 4) or after waiting for about 15 seconds the instrument automatically switches to measuring operation **INS-STOP = ON** when any key is pressed (item 4) or after waiting for about 15 seconds the instrument automatically switches off

9.4 Setting the inspection block

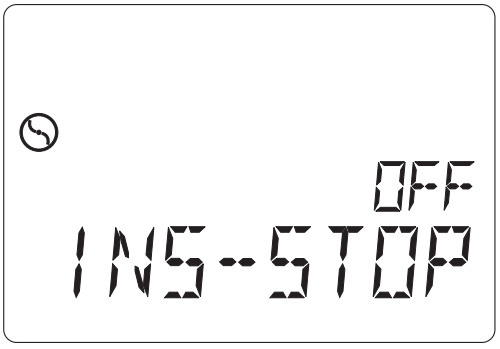
INSPECTION STOP

- you can activate an inspection block to make sure your **SR2-DO** is regularly checked
- this block does not become active until the next inspection date has passed (cf. section 9.3: Setting the inspection interval)
- after that the instrument cannot be used until the inspection has been **carried out and confirmed** (cf. section 7.9: Inspection confirmation)



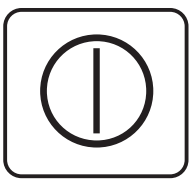
- briefly pressing the **on/off key** brings you to the inspection-block setting facility

Inspection-block condition



- the last setting is displayed, e.g.:
  - **OFF** = block inactive
  - **ON** = block active

- by pressing a **cursor key** ...



- ... and confirming with the **on/off key** you can set the desired condition

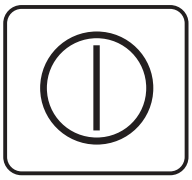
- this setting is preserved even when the instrument is switched off
- pressing the **cursor-up key** brings you to the PIN-code setting facility

9.5 Setting the PIN

PIN

- you can set your **SR2-DO** so that only authorised persons, e.g.:
  - instrument technicians
  - experts

  have access to the information menu with all its subfunctions
- this involves setting a PIN that must be entered every time the information menu is called
- when an incorrect PIN is entered the instrument reverts to its switch-on routine

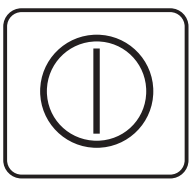


- briefly pressing the **on/off key** brings you to the PIN-code setting facility

Setting the PIN

- the last PIN to be set (**0001** = factory setting) appears in the LC display
- we recommend you to use a different PIN

- by pressing or holding down a **cursor key** ...



- ... and confirming with the **on/off key** you can set each of the 4 digits from left to right to the desired PIN

PIN = 0000

- the function is inactive, every user has access to the information menu

PIN = 0001 ... 9999

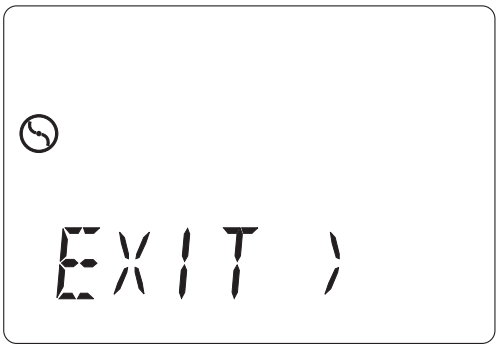
- the function is active, only persons who know the set PIN have access to the information menu
- this setting is preserved even when the instrument is switched off
- pressing the **cursor-up key** brings you to the LC display check facility

Note:
Make a note of your PIN and only give it to authorised persons.
If you forget your PIN, please contact SEWERIN Service.

9.6 Checking the LC display

- with this function you can carry out a **visual check** that all segments of the LC display are in working order
- confirm the LC display check with the **on/off key**
- all the possible LC display characters and symbols are activated
- pressing the **cursor-up key** brings you to the exit from the menu

9.7 Leaving the system menu



EXIT >

- signpost (>) to menu level 1
- pressing the **on/off key** leaves the memory menu
- you are now back at the top main-menu level and can switch between the following menu items:
  - **ADJUSTMENT**
  - **MEMORY**
  - **SYSTEM**
  - **EXIT**

10 Technical aspects

10.1 Technical notes

Probe hoses

The rule of thumb is: the concentration display is delayed by about 1 second for every metre of hose.

Always use SEWERIN probe hoses 1 m, 2 m or 6 m long. 12 m is the maximum length, which should not be exceeded.

Cleaning

The instrument should be cleaned with a damp cloth. Use no solvents, benzene or similar substances.

Static charge

Electrostatic charges should generally be avoided. Electrostatically floating objects (like metallic housings with no earth connection, for example) are unprotected against charges transferred from dust, aerosols and the like.

Fine dust filters

There are fine dust filters in the removable probe connection (item 3) and in most probes.

> ☞ **Note:**
> Heavily-soiled filters should be replaced (cf. section 10.4: Parts subject to wear).

10.2 Technical data

Instrument data	
Serial no:	046 01 XXXX (type - model - number) **without** explosion protection
Serial no:	046 03 XXXX (type - model - number) **with** explosion protection
Dimensions:	129 x 192 x 65 mm (W x H x D)
Weight:	about 1500 g (depending on sensor equipment)
Type of protection:	IP 54
Volume of the buzzer:	typically 95 dB (A) in 30 cm distance
Permissible ranges	
Operating temp.:	-10 °C ... +40 °C
Storage temp.:	-20 °C ... +40 °C
Humidity range:	15% r.h. ... 90% r.h. (not condensing) (briefly 5 % r.h. ... 90 % r.h.)
Pressure range:	800 hPa ... 1200 hPa
Explosion protection (CENELEC) (valid for serial nos. beginning with 046 03)	
Testing institution:	Physikalisch-Technische Bundesanstalt, Braunschweig
Test number:	PTB 96 ATEX 2166, supplements 1 and 3
Identification mark:	⟨Ex⟩ II 2 G EEx ib d IIB T3
Power supply	
Operating time:	min. 10 h
Battery type:	NiCd, rechargeable
Charge voltage:	12 V=
Charge current:	380 mA
Charge time:	13 h
Pump power:	> 50 l/h and >150 mbar
Serial interface:	RS 232, accessory cable if required

Methane/carbon dioxide CH_4/CO_2 sensor

Sensor data

- measurement principle:	thermal condictivity (TC)
- measurement range:	0 ... 100 vol.% in steps of 0.1 vol.% to 9.9 vol.% (CH_4) or in steps of 1 vol.% (CO_2)
- t_{90} time:	< 30 seconds
- storage temperature:	-20 °C ... +60 °C (for replacement sensors)

Lifetime

- guaranteed:	1 year
- expected:	5 years

Test gases

- zero point:	fresh-air
- sensitivity:	100 vol.% CH_4
- sensitivity:	100 vol.% CO_2

Oxygen O_2 sensor

Sensor data

- measurement principle: electrochemical sensor (EC)
- measurement range: 0 ... 25.0 vol.% (AL3) in steps of 0.1 vol.%
- t_{90} time: < 30 seconds
- storage temperature: 0 °C ... +20 °C (for replacement sensors)

Temperature influence

- sensitivity: < 0.3 % signal / °C

Cross-sensitivity

- CO_2: at 5 vol.% CO_2 in 23 vol.% O_2 <= 1 % O_2
- no others known

Lifetime

- guaranteed: 20 months
- expected: 24 months

Test gases

- zero point: fresh-air
- sensitivity: 100 vol.% CH_4

Hydrogen sulphide H_2S 100 ppm sensor

Sensor data

- measurement principle:	electrochemical sensor (EC)
- measurement range:	2 ... 100 ppm (AL3) in steps of 1 ppm
- zero point drift:	3 ppm
- t_{90} time:	< 30 seconds
- storage temperature:	0 °C ... +20 °C (for replacement sensors)

Alarm thresholds (factory settings)

- H_2S:	AL1 = 10 ppm AL2 = 20 ppm

Temperature influence

- zero point:	no temperature influence
- sensitivity:	< 0.5 % signal / °C

Time drift: < 0.3 ppm / month

Cross-sensitivity at 20 °C

- 100 ppm CO:	~ 3 ppm H_2S
- 20 ppm CL_2	~ -1 ppm H_2S
- 500 ppm C_2H_4	~ 2 ppm H_2S
- 2 vol.% H_2:	~ 100 ppm H_2S
- 10 ppm SO_2	~ 3 ppm H_2S
- none known	

Lifetime

- guaranteed:	2 years
- expected:	3 years

Test gases

- zero point:	fresh-air
- sensitivity:	40 ppm H_2S in synthetic air

Hydrogen sulphide H_2S 2000 ppm sensor

Sensor data

- measurement principle:	electrochemical sensor (EC)
- measurement range:	4 ... 2000 ppm (AL3) up to 998 ppm in steps of 2 ppm from 1000 ppm in steps of 10 ppm
- t_{90} time:	< 30 seconds
- storage temperature:	0 °C ... +20 °C (for replacement sensors)

Lifetime

- guaranteed:	2 years
- expected:	3 years

Test gases

- zero point:	fresh-air
- sensitivity:	40 ppm H_2S in synthetic air

Carbon monoxide CO sensor

Sensor data

- measurement principle:	electrochemical sensor (EC)
- measurement range:	2 ... 500 ppm (AL3) in steps of 1 ppm
- zero point drift:	4 ppm
- t_{90} time:	< 30 seconds
- storage temperature:	0 °C ... +20 °C (for replacement sensors)

Alarm thresholds (factory settings)

- CO:	AL1 = 30 ppm AL2 = 60 ppm

Temperature influence

- zero point:	< 5 ppm
- sensitivity:	< 1.4 % signal / °C

Time drift: < 0.3 ppm / month

Cross-sensitivity at 20 °C

- 1000 ppm H_2:	~ 450 ppm CO
- 100 ppm NO	~ 25 ppm CO
- none known	

Lifetime

- guaranteed:	2 years
- expected:	3 years

Test gases

- zero point:	fresh-air
- sensitivity:	40 ppm CO in synthetic air

Ammonia NH_3 sensor

Sensor data

- measurement principle: electrochemical sensor (EC)
- measurement range: 2 ... 100 ppm (AL3) in steps of 1 ppm
- zero point drift: 1 ppm
- t_{90} time: < 90 seconds
- storage temperature: 0 °C ... +20 °C (for replacement sensors)

Alarm thresholds (factory settings)

- NH_3: AL1 = 50 ppm AL2 = 75 ppm

Temperature influence

- zero point: < 2ppm
- sensitivity: no temperature influence

Time drift: < 0.3 ppm / month

Cross-sensitivity at 20 °C

- none known

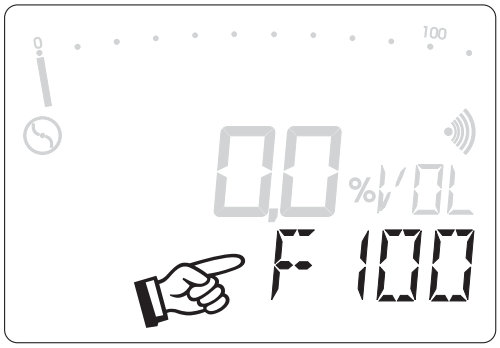
Lifetime

- guaranteed: 1 year
- expected: 2 years

Test gases

- zero point: fresh-air
- sensitivity: 50 ppm NH_3 in nitrogen

10.3 Error messages



- the **SR2-DO** detects faults itself and displays an error code in the LC display

Error code	Cause, remedy and result of error
F1	sensor error: no sensor detected remedy: turn instrument on again, contact SEWERIN Service result of error: instrument switches off
F22, 24	adjustment error: zero point in the CH_4/CO_2 range remedy: check test gas, repeat adjustment result of error: 3s alarm, self-resetting
F23, 25	adjustment error: sensitivity in the CH_4 range remedy: check test gas, repeat adjustment result of error: 3s alarm, self-resetting
F26 - 28	adjustment error: sensitivity in the CO_2 range remedy: check test gas, repeat adjustment result of error: 3s alarm, self-resetting
F32	adjustment error: zero point in the O_2 range (EC), remedy: check test gas, repeat adjustment result of error: 3s alarm, self-resetting
F33..... ...	adjustment error: sensitivity in the O_2 range (EC), remedy: check test gas, repeat adjustment result of error: 3s alarm, self-resetting

Error code	Cause, remedy and result of error
F34	adjustment error: zero point in the CO, H_2S, NH_3 range remedy: check test gas, repeat adjustment result of error: 3s alarm, self-resetting
F35	adjustment error: sensitivity in the CO, H_2S, NH_3 range (EC), remedy: check test gas, repeat adjustment result of error: 3s alarm, self-resetting
F42	O_2 sensor error: reading below measurement range remedy: adjust or replace O_2 sensor, result of error: self-resetting, not clearable
F43	CO sensor error: reading below measurement range remedy: adjust or replace CO sensor, result of error: self-resetting, not clearable
F44	H_2S sensor error (100 ppm): reading below measurement range remedy: adjust or replace H_2S sensor, result of error: self-resetting, not clearable
F45	NH_3 sensor error: reading below measurement range remedy: adjust or replace NH_3 sensor, result of error: self-resetting, not clearable
F47	H_2S sensor error (2000 ppm): reading below measurement range remedy: adjust or replace H_2S sensor, result of error: self-resetting, not clearable
F50	microcontroller ROM test: self test defective remedy: turn instrument on again, contact SEWERIN Service result of error: locking, not clearable
F51	microcontroller RAM test: self test defective remedy: turn instrument on again, contact SEWERIN Service result of error: locking, not clearable

Error code	Cause, remedy and result of error
F52	EEPROM test: read-write error detected remedy: turn instrument on again, contact SEWERIN Service result of error: locking, not clearable
F53	A/D converter: A/D converter defective remedy: turn instrument on again, contact SEWERIN Service result of error: locking, not clearable
F54	external RAM test: self test defective remedy: turn instrument on again, contact SEWERIN Service result of error: locking, not clearable
F55	clock module: clock error remedy: turn instrument on again, contact SEWERIN Service result of error: locking, not clearable
F56	LCD driver: LCD driver error remedy: turn instrument on again,contact SEWERIN Service result of error: locking, not clearable
F67,68	thermal-conductivity (WL/WL) sensor error: remedy: turn instrument on again, contact SEWERIN Service result of error: clearable
F75 - F78	component-error sensor: remedy: turn instrument on again, contact SEWERIN Service result of error: locking, not clearable
F100	pump power too low: remedy: turn instrument on again, check filters in the instrument and probes result of error: locking, not clearable

Error code	Cause, remedy and result of error
F250	discharge warning (after 15 minutes operation): remedy: charge the instrument result of error: clearable
F255	data memory: end of data memory if ring memory OFF (see INFO / MEM / MEM-STOP) result of error: clearable

Alarm	Cause, remedy and result of error
AL3	End of measuring range: Sensor reached end of measuring range warning behaviour: self-resetting on reaching measuring values lower end of measuring range

10.4 Wearing parts

Fine dust filter ..... in the probe connection from the **SR2-DO** (item 3) and in most probes

Hydrophobic filter .. in the 1 m, 2 m and 6 m probe hoses

Test gas can ..... various concentrations for monitoring and adjustment

> ☞ **Note:**
> Test gas bottles are under pressure, do not store above 50 °C. Do not exceed storage time limits.

10.5 Spare parts

> ☞ **Note:**
> When ordering replacement parts, please take these from the relevant Service instructions.

10.6 EC-sensor disposal

> ☞ **Note:**
> EC-sensors must be disposed of by a specialist disposal company.

11 Hints on Disposal

The disposal of instruments and accessories is governed by the European Waste Catalogue (EWC).

Type of Waste	Corresponding EWC Code
Instrument	16 02 13
Test gas can	16 05 05
Battery, accu	16 06 05

Old Instruments

Old instruments can be returned to Hermann Sewerin GmbH.
We will arrange the qualified disposal free of charge through certified specialists.

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

(1) **EG-Baumusterprüfbescheinigung**

(2) Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen - **Richtlinie 94/9/EG**

(3) EG-Baumusterprüfbescheinigungsnummer

PTB 96 ATEX 2166

(4) Gerät: Gasmeß- Gasspürgerät Typ 041 yy xxxx ... 044 yy xxxx

(5) Hersteller: Hermann Sewerin GmbH

(6) Anschrift: Robert-Bosch-Straße 3
D-33334 Gütersloh

(7) Die Bauart dieses Gerätes sowie die verschiedenen zulässigen Ausführungen sind in der Anlage zu dieser Baumusterprüfbescheinigung festgelegt.

(8) Die Physikalisch-Technische Bundesanstalt bescheinigt als benannte Stelle Nr. 0102 nach Artikel 9 der Richtlinie des Rates der Europäischen Gemeinschaften vom 23. März 1994 (94/9/EG) die Erfüllung der grundlegenden Sicherheits- und Gesundheitsanforderungen für die Konzeption und den Bau von Geräten und Schutzsystemen zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen gemäß Anhang II der Richtlinie.

Die Ergebnisse der Prüfung sind in dem vertraulichen Prüfbericht Nr. PTB Ex 96/2/0081 festgelegt.

(9) Die grundlegenden Sicherheits- und Gesundheitsanforderungen werden erfüllt durch Übereinstimmung mit

DIN EN 50014:1994-03 **DIN EN 50018:1995-03** **DIN EN 50020:1996-04**

(10) Falls das Zeichen „X" hinter der Bescheinigungsnummer steht, wird auf besondere Bedingungen für die sichere Anwendung des Gerätes in der Anlage zu dieser Bescheinigung hingewiesen.

(11) Diese EG-Baumusterprüfbescheinigung bezieht sich nur auf Konzeption und Bau des festgelegten Gerätes gemäß Richtlinie 94/9/EG. Weitere Anforderungen dieser Richtlinie gelten für die Herstellung und das Inverkehrbringen dieses Gerätes.

(12) Die Kennzeichnung des Gerätes muß die folgenden Angaben enthalten:

II 2 G EEx ib d IIB T4

Zertifizierungsstelle Explosionsschutz
Im Auftrag

Dr.-Ing. U. Johannsmeyer
Oberregierungsrat

Braunschweig, 08.01.1997

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT 24

Seite 1/2

EG-Baumusterprüfbescheinigungen ohne Unterschrift und ohne Siegel haben keine Gültigkeit.
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Auszüge oder Änderungen bedürfen der Genehmigung der Physikalisch-Technischen Bundesanstalt.

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Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

(13) **Anlage**

(14) **EG-Baumusterprüfbescheinigung PTB 96 ATEX 2166**

(15) Beschreibung des Gerätes

Das Gerät dient zur Messung und zum Aufspüren von Gaskonzentrationen, vorzugsweise Methan vom 10-ppm-Bereich bis zum 100-Vol%-Bereich. Die eingebaute Pumpe fördert das Meßgas.

(16) Prüfbericht Nr. PTB Ex 96/2/0081 (bestehend aus 3 Seiten und 27 Zeichnungen)

(17) Besondere Bedingungen

nicht zutreffend

(18) Grundlegende Sicherheits- und Gesundheitsanforderungen

nicht zutreffend

(19) Hinweisschild

Das Wechseln und Laden des Akkumulators darf nur außerhalb des explosionsgefährdeten Bereiches erfolgen.

Zertifizierungsstelle Explosionsschutz
Im Auftrag

Braunschweig, 08.01.1997

Dr.-Ing. U. Johannsmeyer
Oberregierungsrat

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT 24

Seite 2/2

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Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

1. ERGÄNZUNG

gemäß Richtlinie 94/9/EG Anhang III Ziffer 6

zur EG-Baumusterprüfbescheinigung PTB 96 ATEX 2166

Gerät: Gasmeß-Gasspürgerät Typ 041 yy xxxx ... 044 yy xxxx

Hersteller: Hermann Sewerin GmbH

Anschrift: Robert-Bosch-Straße 3
D-33334 Gütersloh

Beschreibung der Ergänzungen und Änderungen

1. Die Sensorkammer des oben genannten Gerätes darf künftig auch mit Sintermetallelementen als Atmungseinrichtung gefertigt werden.
   Technische Einzelheiten und Prüfergebnisse enthält der vertrauliche Prüfbericht Nr. PTB Ex 97-17045.

2. Werden die Gasmeß-Gasspürgeräte mit einer Meßfunktion für den Explosionsschutz betrieben, ist gemäß Richtlinie 94/9/EG Anhang II Ziffer 1.5.5 bis 1.5.7 eine Funktionsprüfung erforderlich. Dies ist in geeigneter Form dem Betreiber mitzuteilen, z.B. in der Betriebsanleitung.

Prübericht Nr.: PTB Ex 97-17045

Zertifizierungsstelle Explosionsschutz
Im Auftrag

Dr.-Ing. H. Wehinger
Direktor und Professor

Braunschweig, 12.06.1997

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT 24

Seite 1/1

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Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

3. E R G Ä N Z U N G

gemäß Richtlinie 94/9/EG Anhang III Ziffer 6

zur EG-Baumusterprüfbescheinigung PTB 96 ATEX 2166

Gerät: Typ EX TEC Combi und Typ EX TEC SR2-DO

Kennzeichnung: Ⓔx **II 2 G EEx d ib IIB T4/T3**

Hersteller: Hermann Sewerin GmbH

Anschrift: Robert-Bosch-Straße 3
D-33334 Gütersloh

Beschreibung der Ergänzungen und Änderungen

Die Typreihe von Gasmess- Gasspürgeräten wird ergänzt um die Varianten Typ 045 yy xxxxx (EX TEC Combi) und Typ 046 yy xxxxx (EX TEC SR2-DO).

Prüfbericht: PTB Ex 00-29353

Zertifizierungsstelle Explosionsschutz
Im Auftrag

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

Braunschweig, 27. Juni 2000

Seite 1/1

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Auszüge oder Änderungen bedürfen der Genehmigung der Physikalisch-Technischen Bundesanstalt.

Physikalisch-Technische Bundesanstalt • Bundesallee 100 • D-38116 Braunschweig

Konformitätserklärung / Declaration of Conformity

Gerätebezeichnung: *Type of Product:*	**tragbares, batteriebetriebenes Gasmeßgerät** **portable battery-operated gas measuring device**
Geräte-Typ: *Product Name:*	**SR2-DO**
Fabrikations-Nr.: *Fabr.No.:*	**046 01 xxxx**

Hiermit erklären wir, daß oben genanntes Produkt mit der / den folgenden Norm(en) oder normativen Dokument(en) übereinstimmt. Bei einer mit uns nicht abgestimmten Änderung des Produkts verliert diese Erklärung ihre Gültigkeit.

We hereby declare that the above product complies with the following norms or standardized directives. In case of any modification of this product which has not been authorized by us, this declaration becomes invalid.

Norm(en) / Norm(s):

DIN EN 50 081-1	*EMV - Fachgrundnorm Störaussendung* *Generic Emission Standard*
DIN EN 50 082-2	*EMV - Fachgrundnorm Störfestigkeit* *Generic Immunity Standard*

Fundstellen bzgl. EN 50 081/82 sind Amtsblätter der EG Nr. C 44/12 bzw. Nr. C 90/2
The Norms EN 50 081/82 are recorded in the Gazette of the EG No. C 44/12 and No. C 90/2 resp.

Gemäß den Bestimmungen der Richtlinie(n) / The unit is in accordance with:

89/336/EWG	*EG-Richtlinie : Elektromagnetische Verträglichkeit* *EG-Directive: Electromagnetic Compatibility*
92/31/EWG	*Änderung dazu /amendment to above*
93/68/EWG	*Änderung dazu /amendment to above*

Gütersloh, den 21.11.2001

HERMANN SEWERIN GMBH

(Geschäftsführer / Managing Director)

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DIN EN 50 014/18/20	*Ex - Allgemeine Bestimm. /Druckf. Kapselung/ Eigensicherheit* *General Requirements /Flameproof Encl./ Intrinsic Safety -i-*

Fundstellen bzgl. EN 50 081/82 sind Amtsblätter der EG Nr. C 44/12 bzw. Nr. C 90/2
The Norms EN 50 081/82 are recorded in the Gazette of the EG No. C 44/12 and No. C 90/2 resp.

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93/68/EWG	*Änderung dazu /amendment to above*
94/9/EG	*ATEX 100a* *Funktionsüberprüfung nicht enthalten /* *Function inspection not include*

Gütersloh, den 21.11.2001

HERMANN SEWERIN GMBH

(Geschäftsführer / Managing Director)

TEST REPORT **SR2-DO**

Sensor

Serial no. (e.g. 046 01 0001)

CH_4	CO_2	O_2	H_2S	CO	NH_3

SEWERIN

19.11.2004

1.0	**Device status**											
1.1	- status correct (e.g.: Y / N)											
1.2	- fine dust filters ok (e.g.: Y / N)											
1.3	- remaining operating hours (e.g.: 5 h)											

2.0	**Pump test**											
2.1	- low pressure > 150 mbar											
2.2	- volumen flow > 30 l/h											

3.0	**CH_4-range**											
3.1	zero point (fresh-air) - display -1,0 ... +1,0 vol.%											
3.2	test gas 100 vol.% CH_4 - display 97 ... 103 vol.%											

4.0	**CO_2-range**											
4.1	zero point (fresh-air) - display -1 ... +1 vol.%											
4.2	test gas 100 vol.% CO_2 - display 97 ... 103 vol.%											

5.0	**O_2-range**											
5.1	zero point (fresh-air) - display 20,4 ... 21,4 vol.%											
5.2	test gas 100 vol.% CH_4 - display -0,5 ... +0,5 vol.%											

6.0	**H_2S-range**											
6.1	zero point (fresh-air) - display -10 ... +10 ppm											
6.2	test gas (40 ppm H_2S) - display 36 ... 44 ppm											

7.0	**CO-range**											
7.1	zero point (fresh-air) - display -3 ... +3 ppm											
7.2	test gas (40 ppm CO) - display 37 ... 43 ppm											

8.0	**NH_3-range**											
8.1	zero point (fresh-air) - display -3 ... +3 ppm											
8.2	test gas (50 ppm NH_3) - display 47 ... 53 ppm											

9.0	**Observations** - housing broken - adjustment, repair - factory inspection - or the like											

10.0	**Test**											
	- day											
	- month											
	- year											
	- signature											

Hermann Sewerin GmbH
Robert-Bosch-Straße 3 · 33334 Gütersloh · Germany
Telephone +49 5241 934-0 · Fax +49 5241 934-444
www.sewerin.com · info@sewerin.com